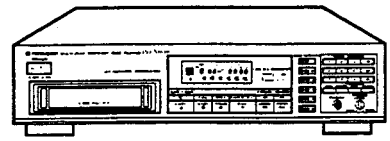
PIONEER®
The future of sound and vision.

Service Manual



ORDER NO.
ARP1713

MULTI-PLAY COMPACT DISC PLAYER

PD-M610
PD-M510
PD-M410

MODELS PD-M610, PD-M510 AND PD-M410 HAVE SEVEN VERSIONS :

Type	Applicable model			Power requirement	Export destination
	PD-M610	PD-M510	PD-M410		
KU	○	○	○	AC120V only	U.S.A.
KC	○	○	○	AC120V only	Canada
HEM	○	–	○	AC220V,240V (switchable) *	European continent
HB	○	–	–	AC220V,240V (switchable) *	United kingdom
SD	○	○	○	AC110V,120 – 127V,220V,240V (switchable)	Kingdom of Saudi Arabia and General market
SD/G	○	○	–	AC110V,120 – 127V,220V,240V (switchable)	U. S. Military
HP	–	○	○	AC220V,240V (switchable) *	Australia

* Change the connection wire from Power switch board assembly to Transformer board assembly.

- **This service manual is applicable to the PD-M610/KU KC, PD-M510/KU, KC, PD-M410/KU and KC types.**
- **For the PD-M510/KU type, please refer to pages 65.**
- **For the PD-M510/KC, PD-M410/KU and KC types, please refer to pages 83.**
- **For the other types, refer to additional service manual.**
- **Ce manuel pour le service comprend les explications en français de réglage.**
- **Este manual de servicio trata del método ajuste escrito en español.**

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911
© PIONEER ELECTRONIC CORPORATION 1989
IFO MAR. 1989 Printed in Japan

CONTENTS

1. SAFETY INFORMATION 2
2. EXPLODED VIEWS AND PARTS LIST 4
3. PACKING 10
4. SCHEMATIC DIAGRAM 14
5. P. C. BOARDS CONNECTION DIAGRAM 20
6. ELECTRICAL PARTS LIST 27
7. ADJUSTMENTS 29
   RÉGLAGES 39
   AJUSTE 49
8. IC INFORMATION 59
9. REMOTE CONTROL UNIT 60
10. EXPLODED VIEWS AND PARTS LIST 65
11. SCHEMATIC DIAGRAM 68
12. P. C. BOARDS CONNECTION DIAGRAM 74
13. ELECTRICAL PARTS LIST 81
14. FOR PD-M510/KC, PD-M410/KU AND KC TYPES 83
15. PANEL FACILITIES 84
16. SPECIFICATIONS 86

1. SAFETY INFORMATION

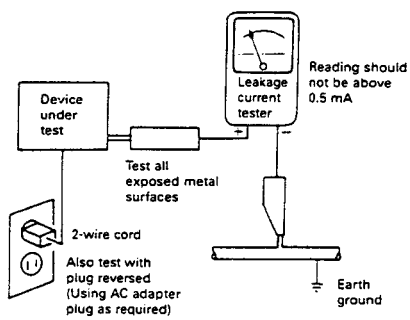
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120 V AC 60 Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5 mA.


Leakage current tester
Reading should not be above 0.5 mA
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR EUROPEAN MODEL ONLY)

VAROITUS!
LAITE SISALTAA LASERDIODIN, JOKA LAHETTAA NAKYMATONTA, SILMILLE VAARALLISTA INFRAPUNASATEILYA LAITTEEN SISALLA ON LASERDIODIN LAHEISYYDESSA KUVAN 1. MUKAINEN VAROITUSMERKKI.

LASER
Kuva 1
Lasersateilyn varoitusmerkki

WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.

LASER
Picture 1
Warning sign for laser radiation

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

IMPORTANT
THIS PIONEER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

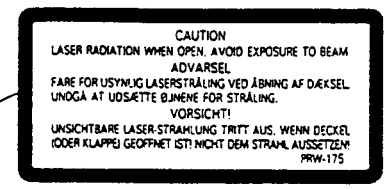
VIKTIGT
APARATEN INNEHÅLLER LASER AV HÖGRE KLASS ÄN 1. INGREPP I APPARATEN BÖR GÖRAS AV SPECIELLT UTBILDAD PERSONAL.

LABEL CHECK

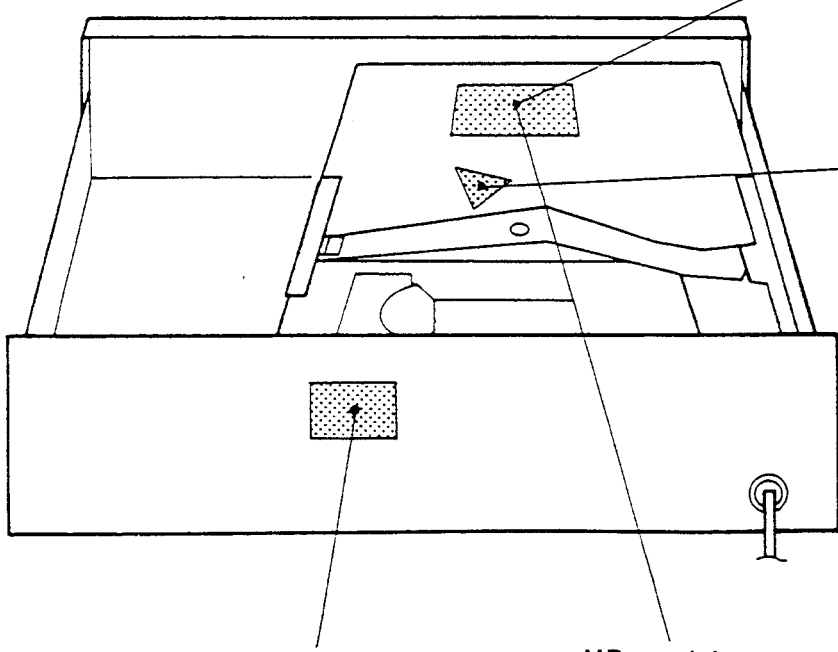
Additional Laser Caution

1. Laser Interlock Mechanism
   The ON/OFF (L/H) modes of the loading state detection switches, LPS1 (S701) and LPS2 (S702), are detected with the system microcomputer. The laser diode does not oscillate unless these switches are both ON (L), This is the so called clamped state. Consequently, if these switches are short-circuited on purpose, the interlock becomes invalid. Also, in the test mode (refer to page 29), the interlock mechanism does not operate. When pins ④, ⑤ or ㉙ of CXA1081S (IC1) is short-circuited to GND, or when there is a short-circuit between the respective pins of Q1 (fault condition), the laser diode keeps oscillating.
2. If the fault condition described in 1 is induced with the cover open and with the servo mechanism block removed to be turned over, close viewing of the objective lens with the naked eye will cause exposure to a class 1 or higher laser beam.

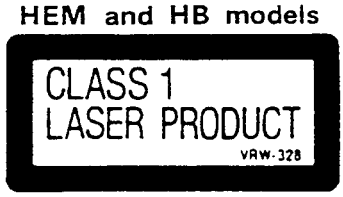
HEM model


CAUTION
LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM
ADVARSEL
FARE FOR USYNLIG LASERSTRÅLING VED ÅBNING AF DÆKSEL.
UNDGÅ AT UDSÆTTE ØJNENE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRAHLUNG TRITT AUS, WENN DECKEL
(ODER KLAPPE) GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
PRW-175

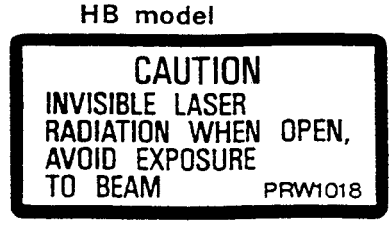
HEM and HB models



HEM and HB models



HB model



2. EXPLODED VIEWS AND PARTS LIST (FOR PD-M610/KU TYPE)

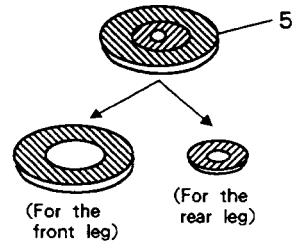
NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

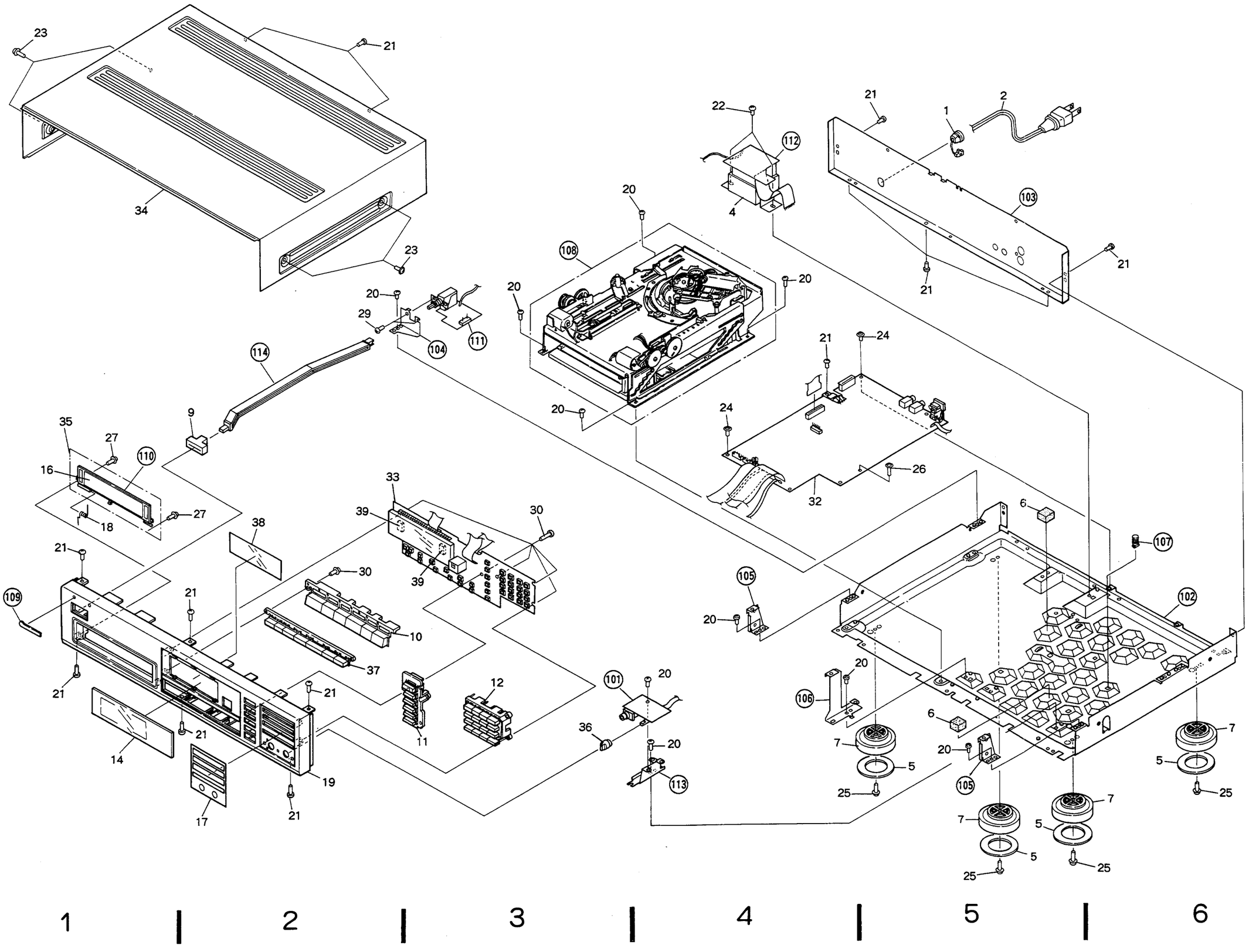
2.1 EXTERIOR

Parts List

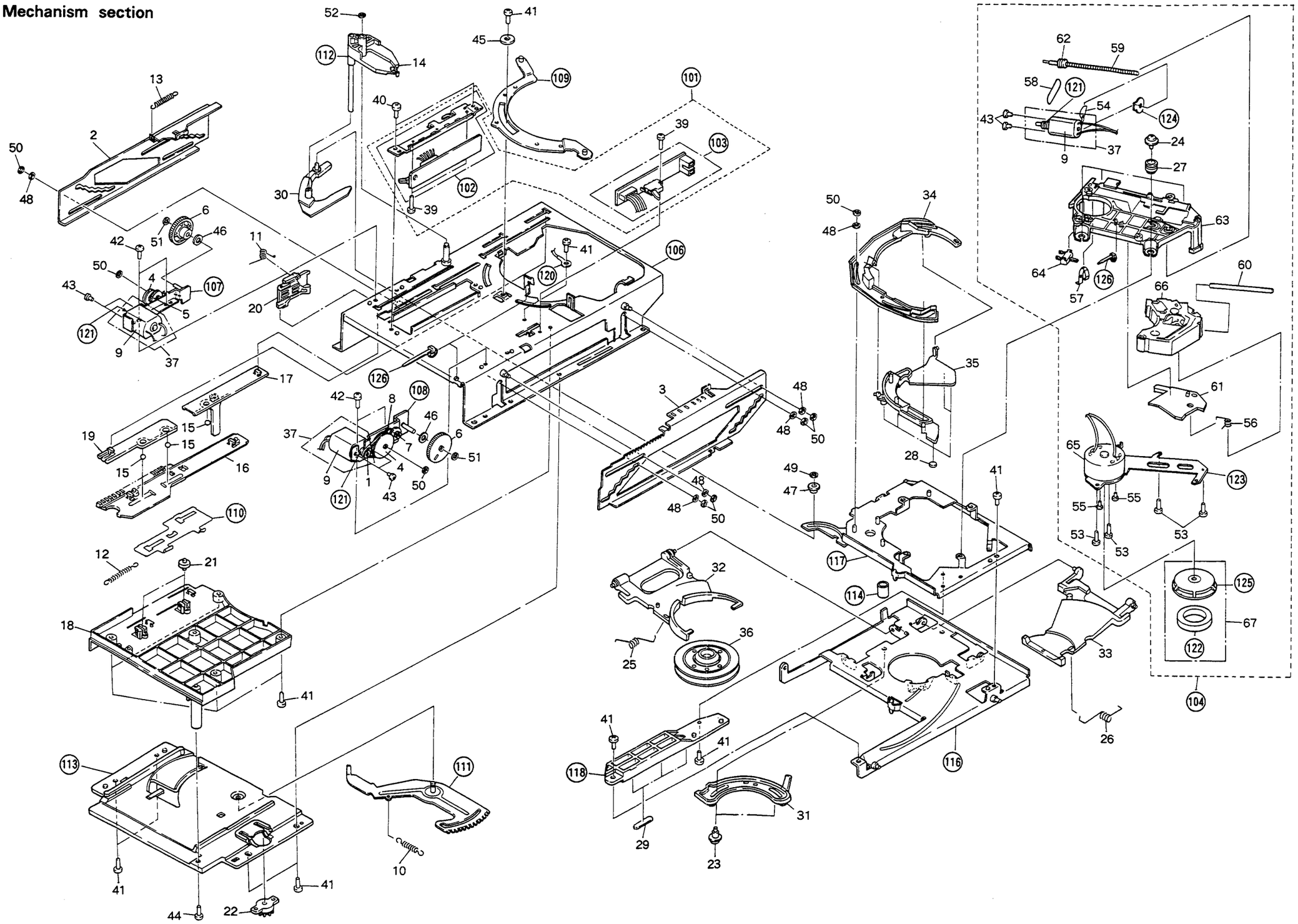
Mark	No.	Part No.	Description
⚠	1	CM-22C	Strain relief
	2		• • • • •
⚠	3	PDG1002	AC power cord
⚠	4	PTT1103	Power transformer (AC120V)
	5	PNM1018	Stopper *
	6	PNM1059	Cushion
	7	PNW1326	Leg (A)
	8		• • • • •
	9	PAC1246	Power button A
	10	PAC1390	Function button
	11	PAC1389	Disc button
	12	PAC1392	Track button
	13		• • • • •
	14	PAM1296	Window
	15		• • • • •
	16	PAM1293	Door name plate
	17	PAM1297	Phono name plate
	18	PBH1022	Door spring
	19	PNW1533	Front panel
	20	BBZ30P060FCC	Screw
	21	BBZ30P080FZK	Screw
	22	BBZ40P060FMC	Screw
	23	FBT40P080FZK	Screw
	24	IBZ30P060FCC	Screw
	25	IBZ30P120FCC	Screw
	26	IBZ30P150FCU	Screw
	27	IPZ30P060FMC	Screw
	28		• • • • •
	29	PMZ30P060FCU	Screw
	30	BBZ30P120FZK	Screw
	31		• • • • •
◉	32	PWZ1605	Main board assembly
◉	33	PWZ1613	Function board assembly
	34	PYY1062	Bonnet
	35	PYY1107	Door assembly
	36	PAC1370	Knob (PHONES LEVEL)
	37	PAC1391	Mode button
	38	PAM1298	Screen
	39	PEB1022	FL spacer
	101		Headphone board assembly
	102		Base
	103		Rear panel
	104		SW angle
	105		Angle
	106		Center angle
	107		P.C.B spacer
	108		Multi mechanism assembly
	109		Name plate
	110		Door
	111		Power switch board assembly
	112		Transformer board assembly
	113		Headphone angle
	114		Joint (POWER)

* The stopper consist of the big ring part and the small ring part.
If you stick the stopper to the leg, stick the big ring part to the front leg, and the small ring part to the rear leg.




1
2
3
4
5
6
A
B
C
D
23
21
34
22
112
4
21
1
2
103
21
20
108
20
20
20
20
29
104
111
114
9
35
27
110
16
18
27
33
39
30
38
39
30
21
21
109
30
10
37
21
21
21
21
14
17
19
21
11
12
101
20
36
20
113
24
21
24
26
32
6
107
105
20
102
106
20
6
7
5
25
20
105
7
5
25
7
5
25
7
5
25

2.2 Mechanism section



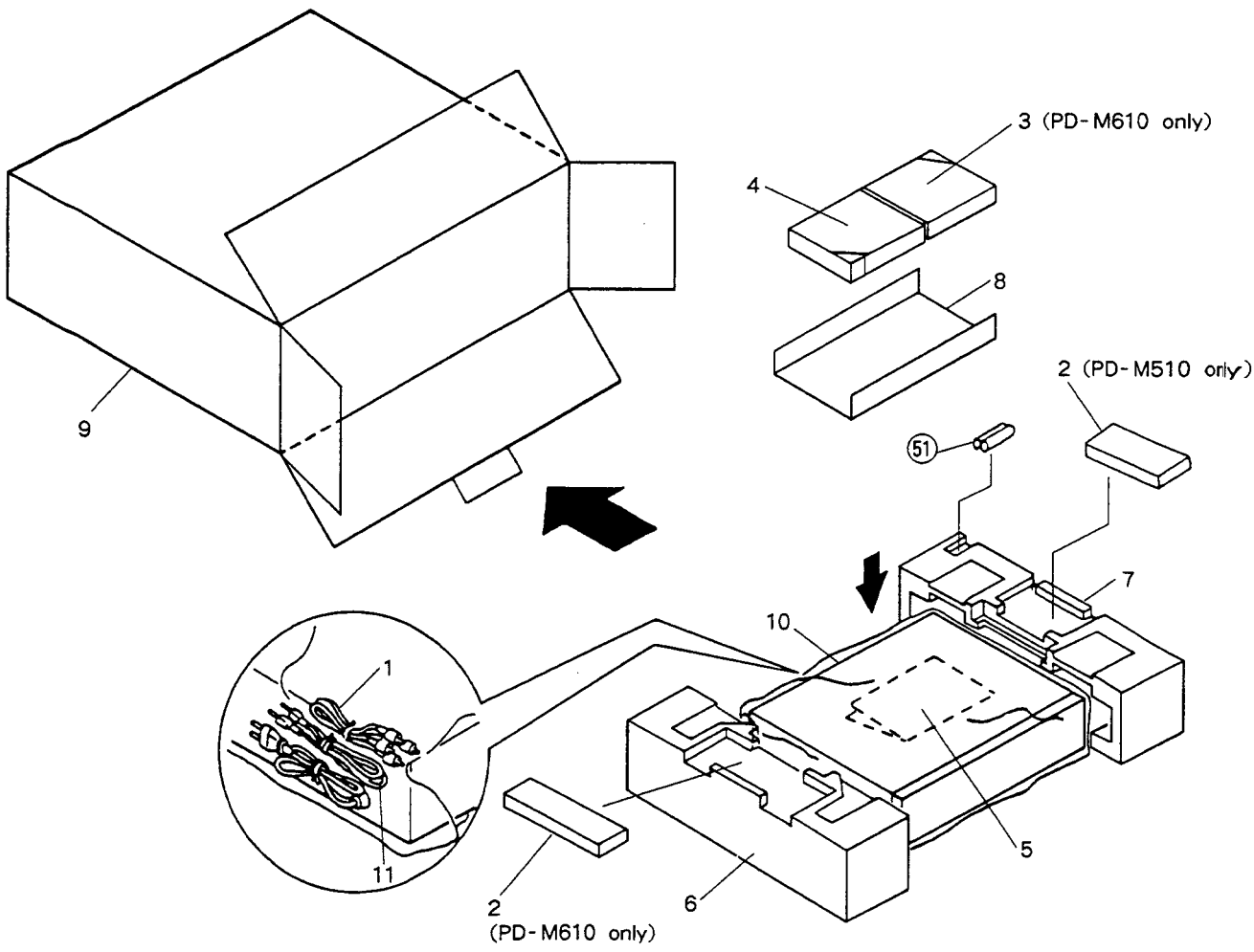
Parts List of Mechanism Section

Mark	No.	Part No.	Description
	1	PEB1015	Belt
	2	PNB1028	Stair (L)
	3	PNB1138	Stair (R)
	4	PNW1095	Gear pulley
	5	PNW1096	Gear
	6	PNW1097	Gear
	7	PNW1098	Idoler gear
	8	PNW1122	Gear
	9	PXM1002	Motor (LOADING, DISC SELECT, CARRIAGE)
	10	PBH-465	Eject spring
	11	PBH1014	Lock spring
	12	PBH1015	SW spring
	13	PBH1018	Stair spring
	14	PBK1009	Drive spring
	15	PBP-001	Steel ball ϕ 4
	16	PNW1099	Rack
	17	PNW1101	Operation plate
	18	PNW1102	Top guide
	19	PNW1253	Drive plate
	20	PNW1395	Lock lever
	21	PNY-386	Roller
	22	PXC-016	Damper assembly
	23	PBA-125	Screw
	24	PBA1002	Screw
	25	PBH1016	Clamper spring (T)
	26	PBH1017	Clamper spring (B)
	27	PEB1014	Float rubber
	28	PED1001	Cushion (A)
	29	PED1002	Cushion (B)
	30	PNW1105	Rotary lever
	31	PNW1106	Clamper cam
	32	PNW1107	Clamper holder (T)
	33	PNW1108	Clamper holder (B)
	34	PNW1110	Pressure cam
	35	PNW1111	Upper tray
	36	PNW1448	Clamper
	37	PYY1025	Motor assembly (LOADING, DISC SELECT, CARRIAGE)
	38		• • • • •
	39	BBZ20P080FMC	Screw
	40	BBZ30P060FCC	Screw
	41	BBZ30P060FMC	Screw
	42	PCZ30P040FMC	Screw
	43	PMZ20P030FMC	Screw
	44	PPZ30P080FMC	Screw
	45	WA30F120M100	Washer
	46	WA31D054D013	Washer
	47	PLA1023	Roller
	48	WA31D054D050	Washer
	49	WT12D032D025	Washer
	50	WT25D047D025	Washer
	51	WT26D060D013	Washer
	52	WT31D054D025	Washer
	53	BPZ20P080FZK	Screw
	54	CGDYX104M25	Semiconductive ceramic capacitor
	55	PBA1037	Screw M2 × 2.5
	56	PBH1008	Drive spring
	57	PBK1057	Plate spring
	58	PEB1072	Belt
	59	PLA1003	Drive worm
	60	PLA1004	Guide bar
	61	PNW1063	Carriage plate
	62	PNW1066	Pully
	63	PNW1520	Mechanism chassis
	64	PSH1003	Slide switch (INSIDE, S101)
	65	PYY1109	Spindle motor assembly (motor with oil)
	66	PWY1009	Pickup assembly
	67	PYY1027	Disc table assembly
	101		Mechanism board assembly
	102		Switch board assembly
	103		Select board assembly
	104		Servo mechanism assembly
	105		• • • • •
	106		Main chassis
	107		Gear angle (L)
	108		Gear angle (R)
	109		Lever
	110		SM select
	111		Eject lever
	112		Drive lever
	113		Bottom guide
	114		Rubber tube
	115		• • • • •
	116		Sub chassis
	117		Upper chassis
	118		Upper guide
	119		• • • • •
	120		Earth lead unit
	121		Motor pulley
	122		Magnet
	123		Base plate
	124		Carriage M board
	125		Disc table
	126		Binder

3. PACKING

Parts List

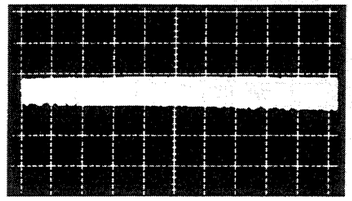
Mark	No.	Part No.	Description
	1	PDE1001	Connection cord with pin plug
	2	PWW1032	Remote control unit (PD−M610 only)
		PWW1034	Remote control unit (PD−M510 only)
	3	PXA1043	Single magazine assembly (PD−M610 only)
	4	PXA1179	Magazine assembly
	5	PRB1088	Operating instructions (English) (PD−M610/KU type)
		PRB1090	Operating instructions (English) (PD−M510/KU type)
	6	PHA1099	Protecter (L)
	7	PHA1100	Protecter (R)
	8	PHC1045	Magazine holder
	9	PHG1317	CD packing case (PD−M610/KU type)
		PHG1318	CD packing case (PD−M510/KU type)
	10	Z23-007	Mat sheet
	11	PDE-319	Connection cord with mini plug
	51		Battery



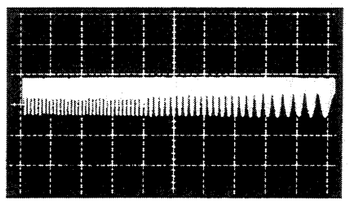
WAVE FORMS

NOTE : The encircled numbers denote measuring points in the schematic diagram.

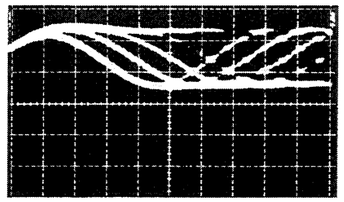
① CN11-5 Pin : PLAY MODE
100mV/div 5msec/div



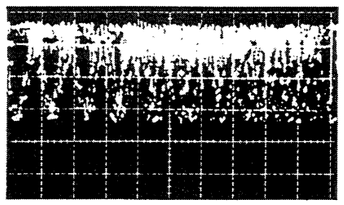
① CN11-5 Pin : SEARCH MODE
100mV/div 5msec/div



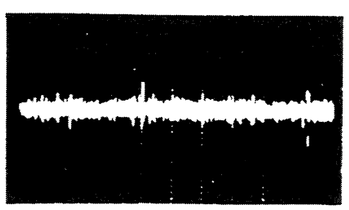
② TP1-1 Pin : PLAY MODE
1V/div 200nsec/div



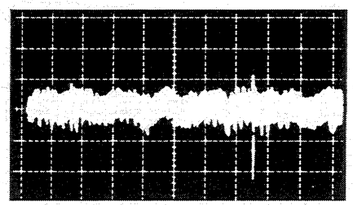
② TP1-1 Pin : SEARCH MODE
500mV/div 5msec/div



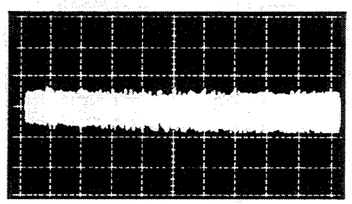
③ TP1-6 Pin : PLAY MODE
500mV/div 10msec/div



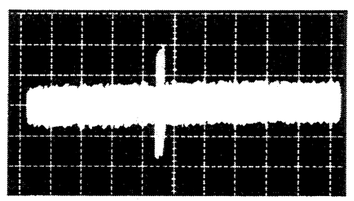
③ TP1-6 Pin : SEARCH MODE
500mV/div 10msec/div



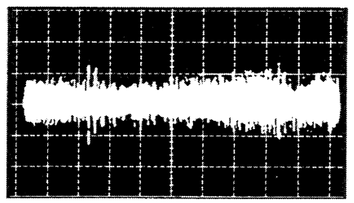
④ TP1-2 Pin : PLAY MODE
1V/div 10msec/div



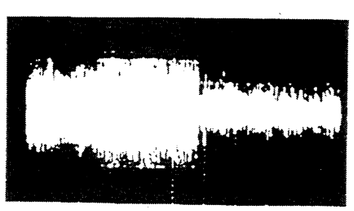
④ TP1-2 Pin : SEARCH MODE
1V/div 10msec/div



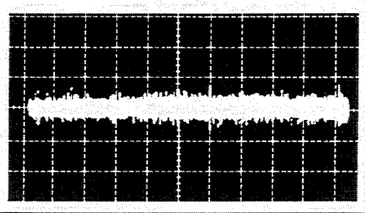
⑤ IC18-1 Pin : PLAY MODE
0.2V/div 10msec/div



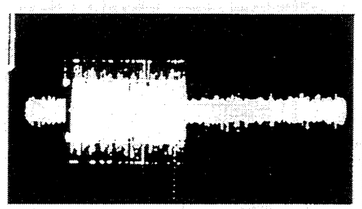
⑤ IC18-1 Pin : SEARCH MODE
0.2V/div 10msec/div



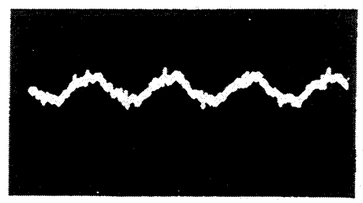
⑥ IC18-9 Pin : PLAY MODE
0.2V/div 10msec/div



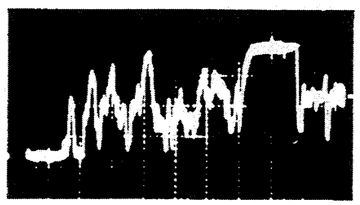
⑥ IC18-9 Pin : SEARCH MODE
0.2V/div 10msec/div



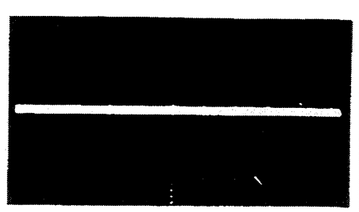
⑦ IC17-1 Pin : PLAY MODE
2V/div 50msec/div



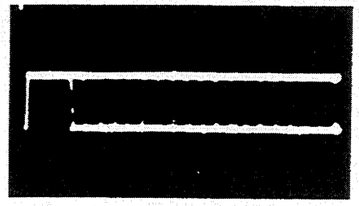
⑦ IC17-1 Pin : SEARCH MODE
2V/div 100msec/div



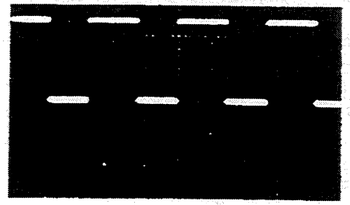
⑧ IC2-33, 34 Pin : PLAY MODE
2V/div 10msec/div



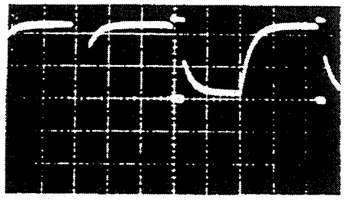
⑨ IC1-27 Pin : PLAY MODE
2V/div 500μsec/div



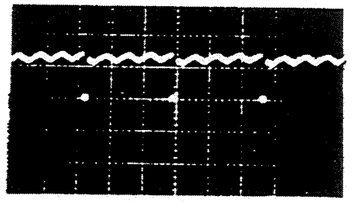
⑩ IC3-4 Pin : PLAY MODE
2V/div 50μsec/div



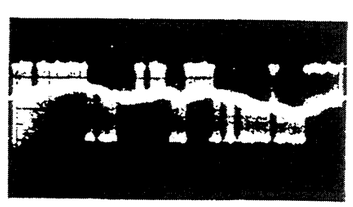
⑩ IC3-4 Pin : SEARCH MODE
2V/div 100msec/div



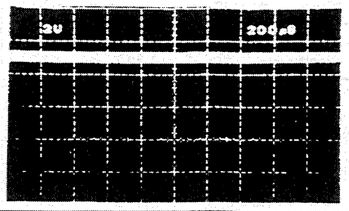
⑪ IC3-3 Pin : PLAY MODE
2V/div 200μsec/div



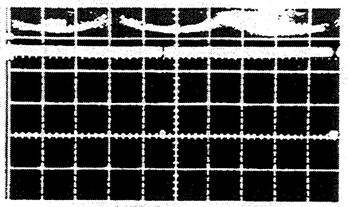
⑪ IC3-3 Pin : SEARCH MODE
2V/div 10msec/div



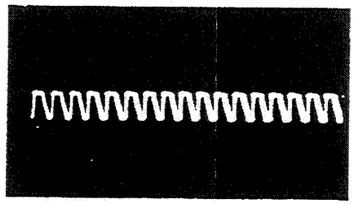
⑫ TP2-1 Pin : PLAY MODE
2V/div 200μsec/div



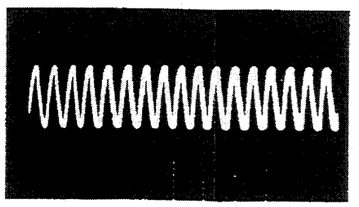
⑫ TP2-1 Pin : SEARCH MODE
2V/div 20msec/div



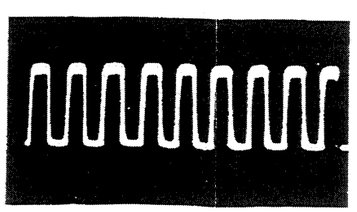
⑬ IC2-38 Pin : PLAY MODE
2V/div 200μsec/div



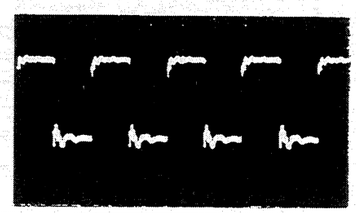
⑭ IC3-8 Pin : PLAY MODE
2V/div 200μsec/div



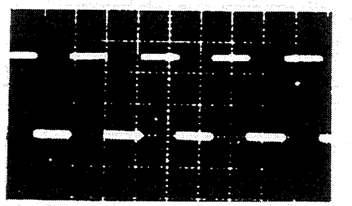
⑮ TP2-2 Pin : PLAY MODE
2V/div 200μsec/div



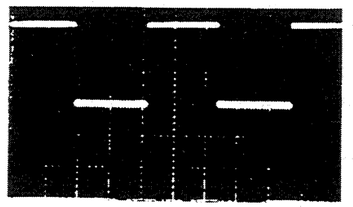
⑯ IC3-76 Pin : STOP MODE
2V/div 200μsec/div



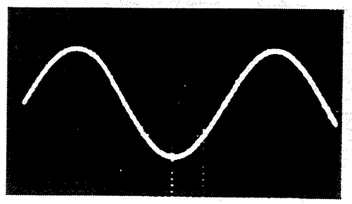
⑰ IC3-79 Pin : STOP MODE
2V/div 5μsec/div



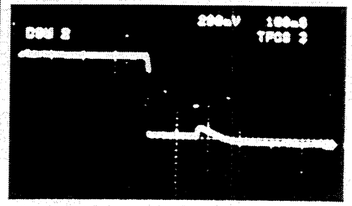
⑱ IC3-80 Pin : STOP MODE
2V/div 5μsec/div



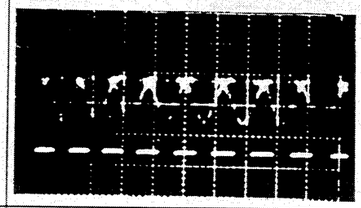
⑲ OUTPUT L ch : PLAY MODE
2V/div 50μsec/div



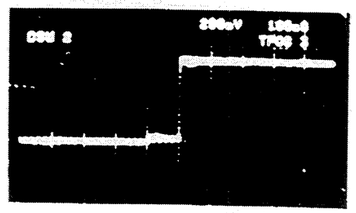
⑳ IC10-5 Pin : POWER OFF
2V/div 100msec/div



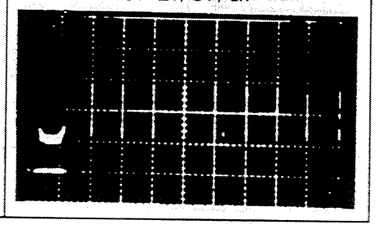
㉑ IC1-22 Pin : TR OPEN
1msec/div
Upper TP-1, 1V/div
Lower IC1-22, 2V/div



⑳ IC10-5 Pin : POWER ON
2V/div 100msec/div



㉒ IC1-21 Pin : DFCT
1msec/div
Upper TP1-1, 1V/div
Lower IC1-21, 5V/div



4. SCHEMATIC DIAGRAM (FOR PD－M610/KU TYPE)

1. RESISTORS :
Indicated in Ω, 1/4W, 1/6W and 1/8W, ± 5 % tolerance unless otherwise noted k ; kΩ, M ; MΩ, (F) ; ± 1 %, (G) ; ± 2 %, (K) ; ± 10 %, (M) ; ± 20 % tolerance.

2. CAPACITORS :
Indicated in capacity (μF) / voltage (V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT :
▭ ; DC voltage (V) at play state.
⇦mA ; DC current at play state.
Value in ( ) is DC current at stop state.

4. OTHERS :
➡ ; Signal route.
⊘ ; Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES : (The underlined indicates the switch position)
OUTSIDE OF P.C.BOARD ASSEMBLY
S101 : INSIDE ON — OFF
MAIN BOARD ASSEMBLY
S1 : TEST MODE ON — OFF
FUNCTION BOARD ASSEMBLY
S201 : EJECT
S202 : 1 ┐
S203 : 2 │
S204 : 3 │ (DISC NO.)
S205 : 4 │
S206 : 5 │
S207 : 6 ┘
S208 : 1 ┐
S209 : 4 │ (TRACK NO.)
S210 : 7 │
S211 : 0 ┘
S212 : TIME FADE
S213 : 2 ┐
S214 : 5 │ (TRACK NO.)
S215 : 8 ┘
S216 : TIME
S217 : PGM MEMORY
S218 : CLEAR
S219 : 3 ┐
S220 : 6 │ (TRACK NO.)
S221 : 9 ┘
S222 : REPEAT
S223 : MANUAL SEARCH (◀◀)
S224 : MANUAL SEARCH (▶▶)
S225 : PLAY
S226 : RANDOM PLAY
S227 : TRACK SEARCH (|◀◀)
S228 : TRACK SEARCH (▶▶|)
S229 : PAUSE
S230 : STOP
S231 : DELETE
S232 : AUTO FADER IN
S233 : AUTO FADER OUT
S234 : (+ 10)
S235 : (≧ 20)

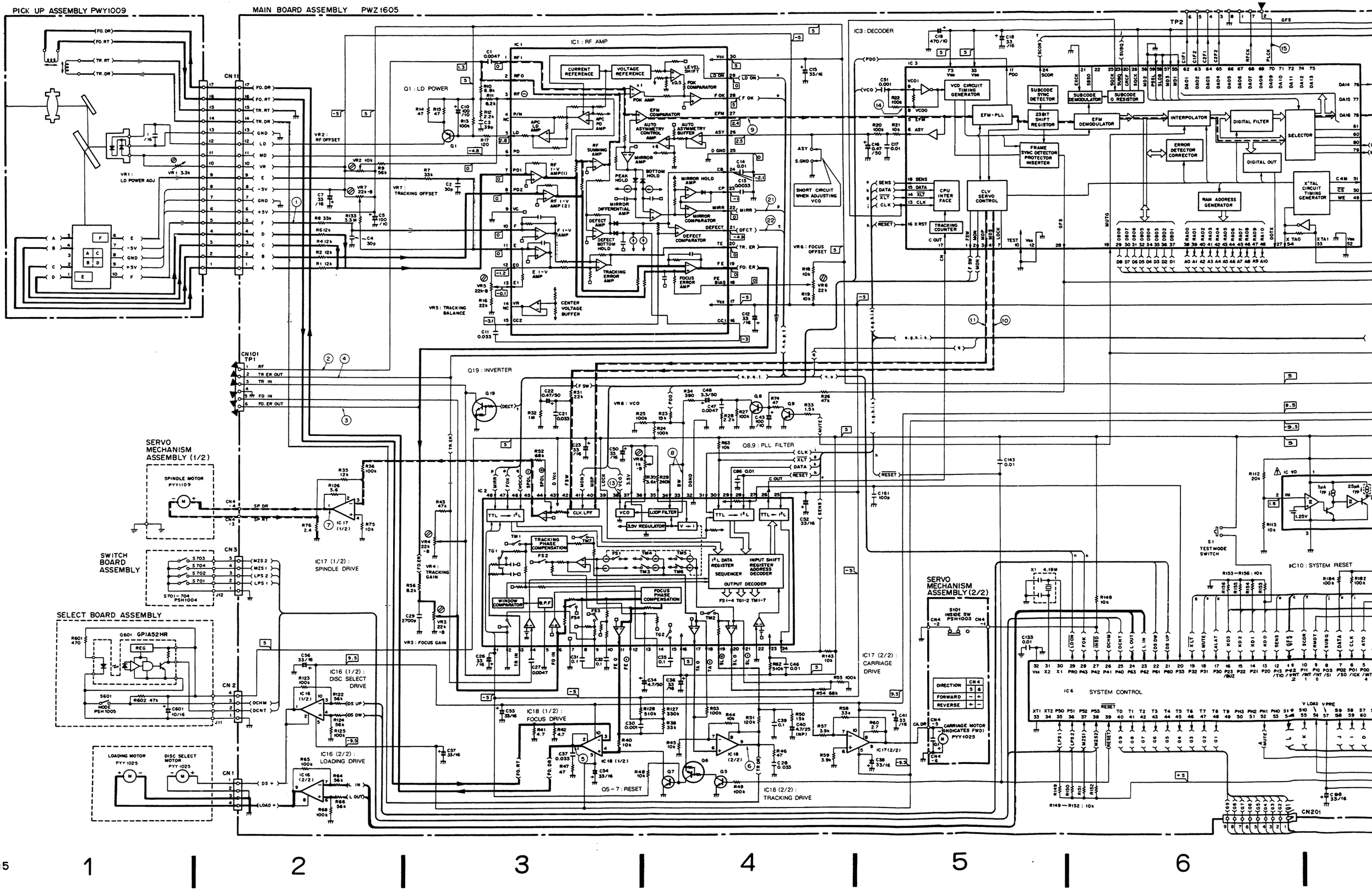
SWITCH BOARD ASSEMBLY
S801 : LPS1 LOADING POSITION
S802 : LPS2

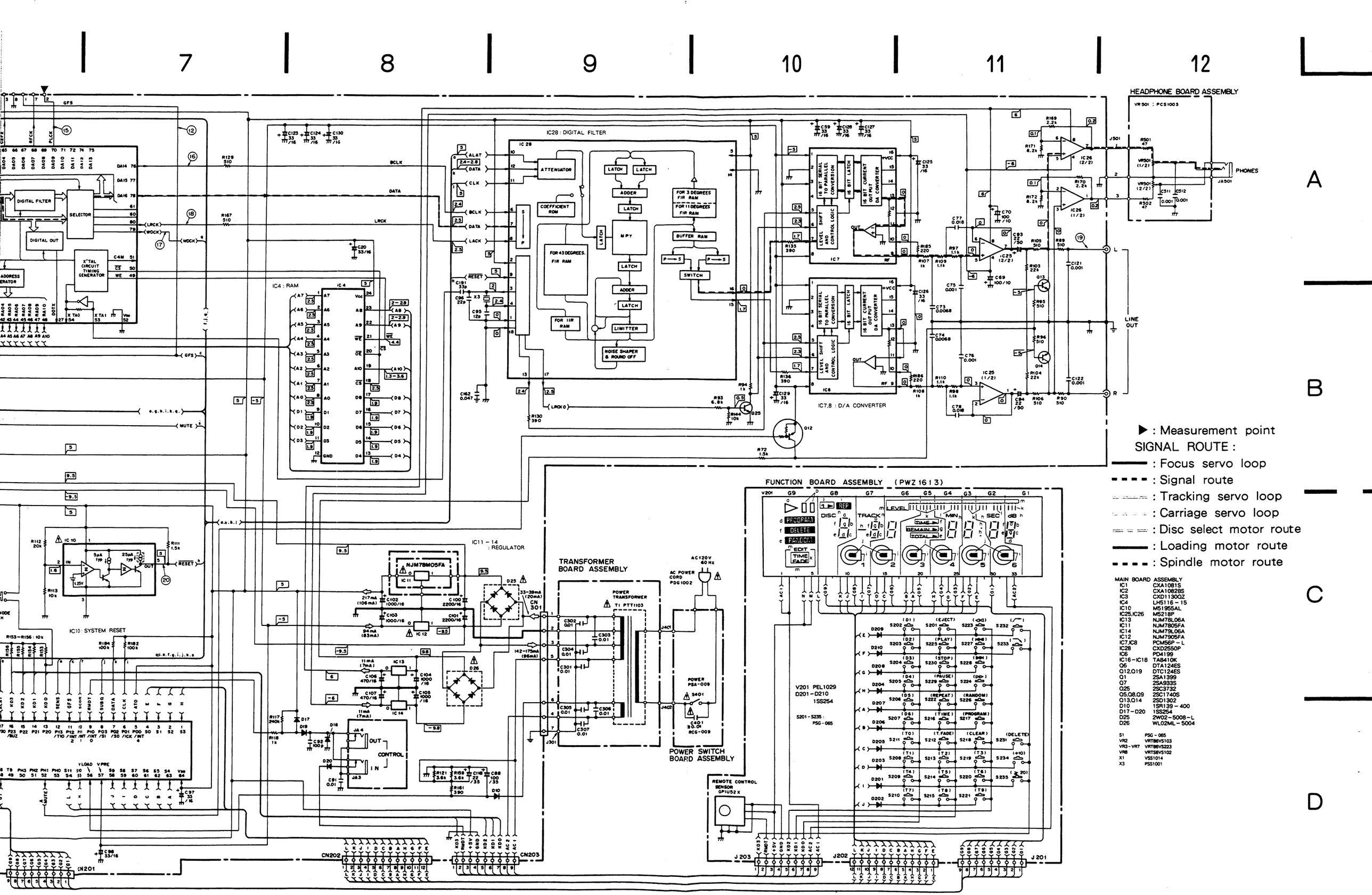
	STOP	DURING THE LOADING	CLAMP CONDITION PLAY	DURING THE EJECT
S801	ON (H)	OFF (L)	OFF (L)	ON (H)
S802	ON (H)	ON (H)	OFF (L)	OFF (L)

S803 : MZS2 MAGAZINE
S804 : MZS1

	NO MAGAZINE	SIX MAGAZINES	SINGLE
S803	ON (H)	OFF (L)	OFF (L)
S804	OFF (L)	ON (H)	OFF (L)

POWER SWITCH BOARD ASSEMBLY
S401 : POWER ON — OFF


PICK UP ASSEMBLY PWY1009
MAIN BOARD ASSEMBLY PWZ1605
IC1 : RF AMP
IC3 : DECODER
Q1 : LD POWER
Q19 : INVERTER
VR8 : VCO
Q8,9 : PLL FILTER
IC 3
IC 2
IC 6 SYSTEM CONTROL
IC10 : SYSTEM RESET
IC16 (1/2) : DISC SELECT DRIVE
IC16 (2/2) : LOADING DRIVE
IC17 (1/2) : SPINDLE DRIVE
IC17 (2/2) : CARRIAGE DRIVE
IC18 (1/2) : FOCUS DRIVE
IC18 (2/2) : TRACKING DRIVE
Q5 – 7 : RESET
SERVO MECHANISM ASSEMBLY (1/2)
SERVO MECHANISM ASSEMBLY (2/2)
SWITCH BOARD ASSEMBLY
SELECT BOARD ASSEMBLY
VR1 : LD POWER ADJ
VR2 : RF OFFSET
VR3 : FOCUS GAIN
VR4 : TRACKING GAIN
VR5 : TRACKING BALANCE
VR6 : FOCUS OFFSET
VR7 : TRACKING OFFSET
CN11
CN101 TP1
CN201
TP2
S1 TEST MODE SWITCH
SHORT CIRCUIT WHEN ADJUSTING VCO
EFM-PLL
CPU INTER FACE
CLV SERVO CONTROL
TRACKING COUNTER
SUBCODE SYNC DETECTOR
SUBCODE DEMODULATOR
SUBCODE Q REGISTER
23BIT SHIFT REGISTER
EFM DEMODULATOR
FRAME SYNC DETECTOR PROTECTOR INSERTER
ERROR DETECTOR CORRECTOR
INTERPOLATOR
DIGITAL FILTER
DIGITAL OUT
SELECTOR
RAM ADDRESS GENERATOR
X'TAL CIRCUIT TIMING GENERATOR
VCO CIRCUIT TIMING GENERATOR
CURRENT REFERENCE
VOLTAGE REFERENCE
LEVEL SHIFT
FOK COMPARATOR
EFM COMPARATOR
AUTO ASYMMETRY CONTROL AMP
AUTO ASYMMETRY BUFFER
RF SUMMING AMP
MIRROR AMP
PEAK HOLD
BOTTOM HOLD
MIRROR HOLD AMP
MIRROR COMPARATOR
DEFECT AMP
DEFECT COMPARATOR
DEFECT BOTTOM HOLD
MIRROR DIFFERENTIAL AMP
TRACKING ERROR AMP
FOCUS ERROR AMP
CENTER VOLTAGE BUFFER
APC LD AMP
APC PD AMP
RF I-V AMP(1)
RF I-V AMP(2)
F I-V AMP
E I-V AMP
TRACKING PHASE COMPENSATION
FOCUS PHASE COMPENSATION
WINDOW COMPARATOR
B.P.F
CLV. LPF
VCO
LOOP FILTER
3.5V REGULATOR
I²L DATA REGISTER SEQUENCER
INPUT SHIFT REGISTER ADDRESS DECODER
OUTPUT DECODER
FS1-4 TG1-2 TM1-7
SPINDLE MOTOR PYY1109
LOADING MOTOR PYY1025
DISC SELECT MOTOR PYY1025
CARRIAGE MOTOR (INDICATES FWD) PYY1025
S701 – 704 PSH1004
S601 MODE PSH1005
S101 INSIDE SW PSH1003
SP DR
SP RT
DIRECTION
FORWARD
REVERSE
CN 4
5 6
– +
+ –


HEADPHONE BOARD ASSEMBLY
VR501 : PCS1003
PHONES
JA501
LINE OUT
IC28 : DIGITAL FILTER
IC4 : RAM
IC7,8 : D/A CONVERTER
IC10 : SYSTEM RESET
IC11 – 14 : REGULATOR
TRANSFORMER BOARD ASSEMBLY
POWER SWITCH BOARD ASSEMBLY
FUNCTION BOARD ASSEMBLY (PWZ1613)
REMOTE CONTROL SENSOR GP1U52X
AC 120V 60Hz
AC POWER CORD PDG1002
V201 PEL1029
D201 – D210 1SS254
S201 – S235 : PSG-065
▶ : Measurement point
SIGNAL ROUTE :
: Focus servo loop
: Signal route
: Tracking servo loop
: Carriage servo loop
: Disc select motor route
: Loading motor route
: Spindle motor route
MAIN BOARD ASSEMBLY
IC1 CXA1081S
IC2 CXA1082BS
IC3 CXD1130Q
IC4 LH5116 – 15
IC10 M51955AL
IC25,IC26 M5218P
IC13 NJM78L06A
IC11 NJM7805FA
IC14 NJM79L06A
IC12 NJM7905FA
IC7,IC8 PCM56P – L
IC28 CXD2550P
IC6 PCM4199
IC16 – IC18 TA8410K
Q6 DTA124ES
Q12,Q19 DTC124ES
Q1 2SA1399
Q7 2SA933S
Q25 2SC3732
Q5,Q8,Q9 2SC1740S
Q13,Q14 2SD1302
D10 1SR139 – 400
D17 – D20 1SS254
D25 2W02 – 5008 – L
D26 WL02ML – 5004
S1 PSG – 065
VR2 VRTB6VS103
VR3 – VR7 VRTB6VS223
VR8 VRTS6VS102
X1 VSS1014
X3 PSS1001

IC2
(CXA1082BS)

Pin No.	Voltage	Pin No.	Voltage
1	– 5	25	– 5
2	0	26	0
3	0	27	5
4	0	28	5
5	0	29	5
6	0	30	5
7	0	31	5
8	0	32	0
9	0	33	2.5
10	0	34	2.5
11	0	35	2.3
12	0	36	2.3
13	0.2	37	2.5
14	0	38	2.4
15	0	39	5
16	5	40	2.5
17	0	41	5
18	0	42	2.5
19	0	43	5
20	0	44	0
21	0	45	0.2 – 0.6
22	0	46	2.5
23	– 4.1	47	5
24	5	48	0

IC3
(CXD1130QZ)

Pin No.	Voltage	Pin No.	Voltage
1	2.5	41	2.5
2	5	42	2.5
3	2.5	43	2.5
4	2.8	44	2.5
5	2.4	45	2.5
6	2.5	46	2.0 – 2.9
7	5	47	2.0 – 2.9
8	2.4	48	1.3 – 3.6
9	2.4	49	4.4
10	0	50	2.5
11	1.8	51	2.3
12	0	52	0
13	5	53	2.2
14	5	54	2.2
15	5	55	5
16	5	56	0
17	0	57	5
18	5	58	0
19	0	59	0
20	5	60	1.3
21	0	61	1.3
22	0	62	0
23	0	63	0
24	0	64	0
25	5	65	0
26	5	66	0
27	2.5	67	0
28	5	68	2.5
29	1.9	69	2.5
30	1.9	70	2.3
31	1.9	71	5
32	1.9	72	0
33	5	73	5
34	1.9	74	0
35	1.9	75	2.4
36	1.9	76	2.3
37	1.9	77	2.3
38	2.5	78	2.5
39	2.5	79	2.5
40	2.5	80	2.5

IC6
(PD4199)

Pin No.	Voltage	Pin No.	Voltage
1	-12.5 – -12.7	33	0
2	-19.2 – -22.7	34	5
3	-9.9 – -13.2	35	0
4	-12.5 – -15.4	36	0
5	5	37	0
6	5	38	5
7	2.5 – 2.8	39	5
8	0.2 – 2.7	40	– 23.1
9	4.9	41	– 23.1
10	0.1	42	– 23.2
11	5	43	– 23.1
12	5	44	– 23.1
13	0	45	– 23.1
14	0	46	– 23.1
15	0	47	– 23.1
16	0	48	– 23.1
17	5	49	0
18	0	50	0
19	5	51	5
20	5	52	5
21	0	53	0
22	0	54	-19.6 – -19.8
23	0	55	-7.1 – -7.4
24	0	56	– 26.2
25	5	57	– 5
26	5	58	-19.5 – -19.9
27	5	59	-4.3 – -4.6
28	5	60	-9.3 – -12.6
29	0	61	– 0.9
30	2.4	62	-3.9 – -7
31	2.6	63	-9.3 – -15.5
32	0	64	5

5. P. C. BOARDS CONNECTION DIAGRAM (FOR PD-M610/KU TYPE)

P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
	E or E	Transistor			Ceramic capacitor
1					
D S G	D S G or D S G	FET			Mylar capacitor
			SA		Styrol capacitor
		Diode	NP		Electrolytic capacitor (Non polarized)
			NL		Electrolytic capacitor (Noiseless)
		Zenner diode		+	Electrolytic capacitor (Polarized)
					Electrolytic capacitor (Polarized)
		LED			Power capacitor
		Varactor			Semi-fixed resistor
		Tact switch			Resistor array
					Resistor
		Inductor			
		Coil			Resonator
4 3 2 1 6		Transformer			Thermistor
8 1		Filter			

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with O shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

1 2 3 4 5 6

A

B

C

D

SERVO MECHANISM ASSEMBLY

S101
INSIDE SW
PSH 1003

CN 4-1
CN 4-2

SPINDLE MOTOR
PYY1109

CN 4-3
CN 4-4

CARRIAGE MOTOR
(INDICATES FWD)
PYY 1025

CN 4-5
CN4-6

0.1

DIRECTION	CN4 5	6
FORWARD	−	+
REVERSE	+	−

PICKUP ASSEMBLY (PWY1009)

FO. DR
FO. RT
TR. RT
TR. DR

CN 11

VR1 3.3k
VR1:
LD POWER ADJ

A B C D E F

-5V GND +5V

SWITCH BOARD ASSEMBLY

CN 3

S703 S704 S702 S701

S701-704
PSH1004

J12

SELECT BOARD ASSEMBLY

Q601 GP1A52HR

R601 470

REG

S601
MODE
PSH1005

R602 47k

C601 10/16

CN 2

J11

LOADING MOTOR
PYY 1025

DISC SELECT MOTOR
PYY 1025

CN 1

MAIN BOARD ASSEMBLY
(PWZ1605)

CONTROL
OUT IN

LINE OUT

IC14
Q14
IC26 Q13
IC13 Q12
IC25
IC12
IC11
Q1
IC8 IC7
VR2
VR5
IC10
Q25
IC28
IC1
TP2
Q6 Q5
VR6
VR7
Q19
TP1
Q7
IC18
IC4
VR4
IC3
IC2
Q9
Q8
VR8
IC17
IC16
IC6

PWM 1195

CN101 CN11 CN12 CN13 CN201 CN203 CN4

DIP

HEADPHONE BOARD ASSEMBLY

VR501 R501 R502 J501 C511 C512 JR501 PHONES

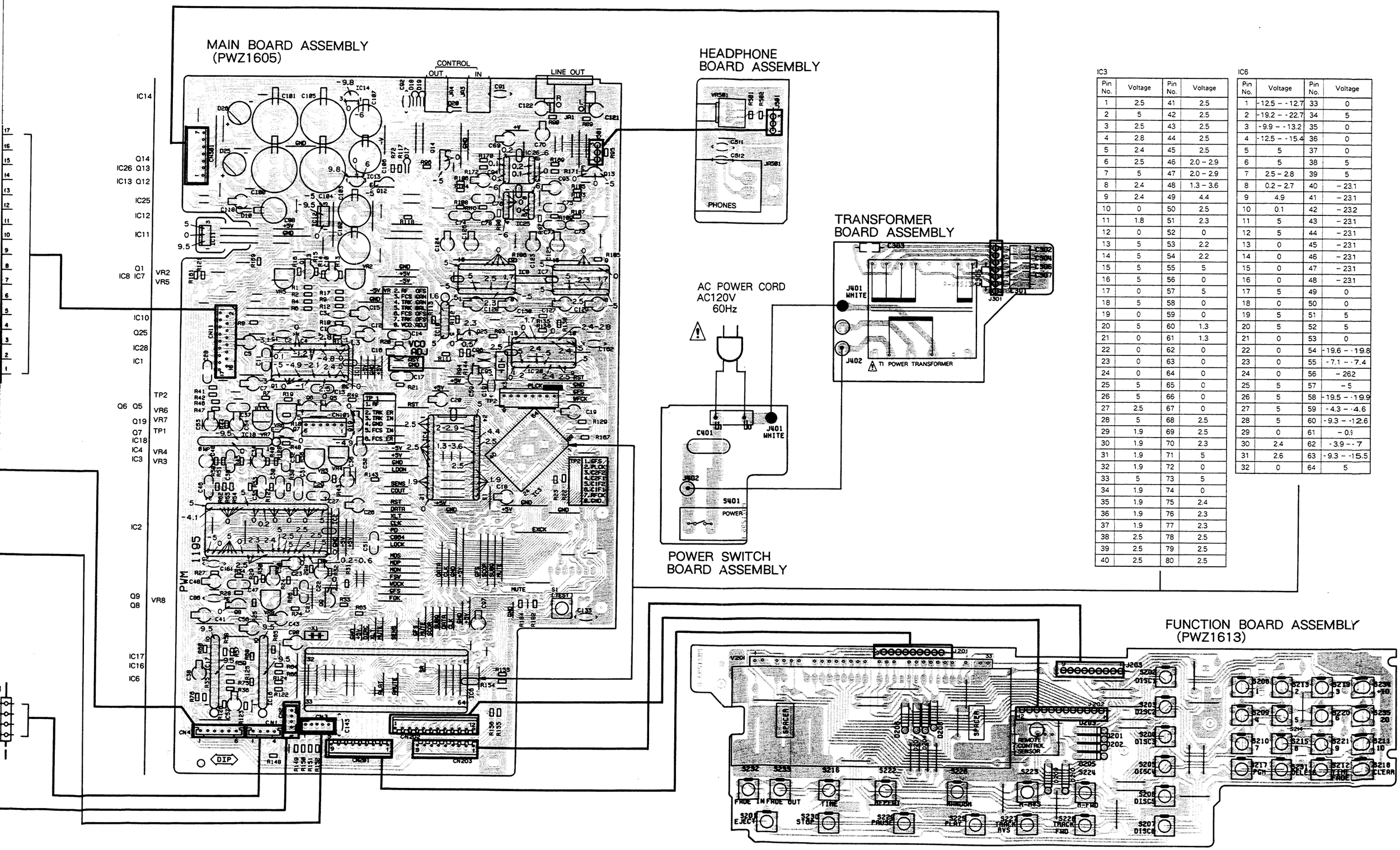
AC POWER CORD
AC120V
60Hz

J401 WHITE C401 J402 S401 POWER

POWER SWITCH BOARD ASSEMBLY

V201 SPACER

S232 S233 S231
FADE IN FADE OUT TIME
S208 EJECT
S230 STOP

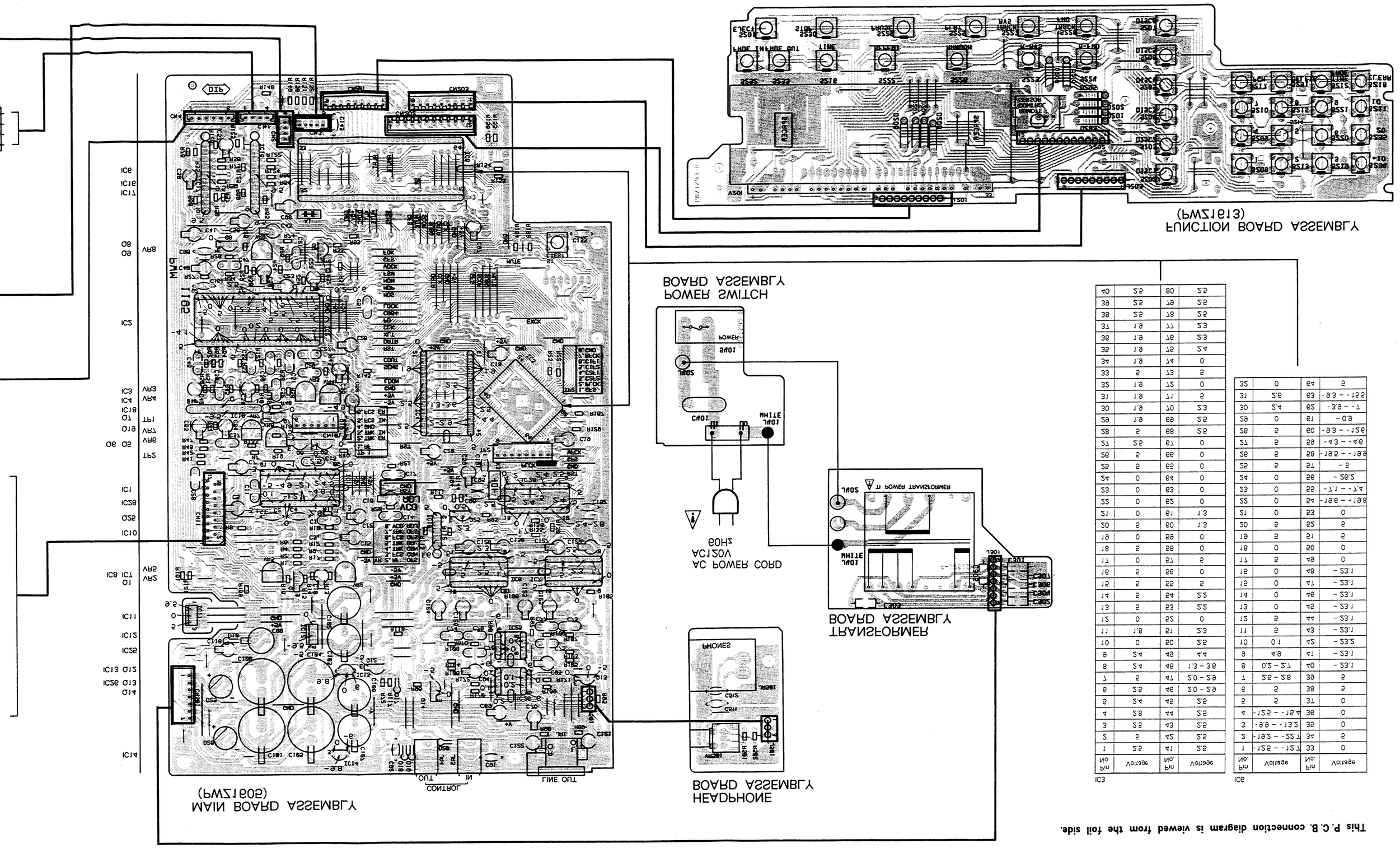


IC3

Pin No.	Voltage	Pin No.	Voltage
1	2.5	41	2.5
2	5	42	2.5
3	2.5	43	2.5
4	2.8	44	2.5
5	2.4	45	2.5
6	2.5	46	2.0 – 2.9
7	5	47	2.0 – 2.9
8	2.4	48	1.3 – 3.6
9	2.4	49	4.4
10	0	50	2.5
11	1.8	51	2.3
12	0	52	0
13	5	53	2.2
14	5	54	2.2
15	5	55	5
16	5	56	0
17	0	57	5
18	5	58	0
19	0	59	0
20	5	60	1.3
21	0	61	1.3
22	0	62	0
23	0	63	0
24	0	64	0
25	5	65	0
26	5	66	0
27	2.5	67	0
28	5	68	2.5
29	1.9	69	2.5
30	1.9	70	2.3
31	1.9	71	5
32	1.9	72	0
33	5	73	5
34	1.9	74	0
35	1.9	75	2.4
36	1.9	76	2.3
37	1.9	77	2.3
38	2.5	78	2.5
39	2.5	79	2.5
40	2.5	80	2.5

IC6

Pin No.	Voltage	Pin No.	Voltage
1	-12.5 – -12.7	33	0
2	-19.2 – -22.7	34	5
3	-9.9 – -13.2	35	0
4	-12.5 – -15.4	36	0
5	5	37	0
6	5	38	5
7	2.5 – 2.8	39	5
8	0.2 – 2.7	40	– 23.1
9	4.9	41	– 23.1
10	0.1	42	– 23.2
11	5	43	– 23.1
12	5	44	– 23.1
13	0	45	– 23.1
14	0	46	– 23.1
15	0	47	– 23.1
16	0	48	– 23.1
17	5	49	0
18	0	50	0
19	5	51	5
20	5	52	5
21	0	53	0
22	0	54	-19.6 – -19.8
23	0	55	-7.1 – -7.4
24	0	56	– 26.2
25	5	57	– 5
26	5	58	-19.5 – -19.9
27	5	59	-4.3 – -4.6
28	5	60	-9.3 – -12.6
29	0	61	– 0.9
30	2.4	62	-3.9 – -7
31	2.6	63	-9.3 – -15.5
32	0	64	5



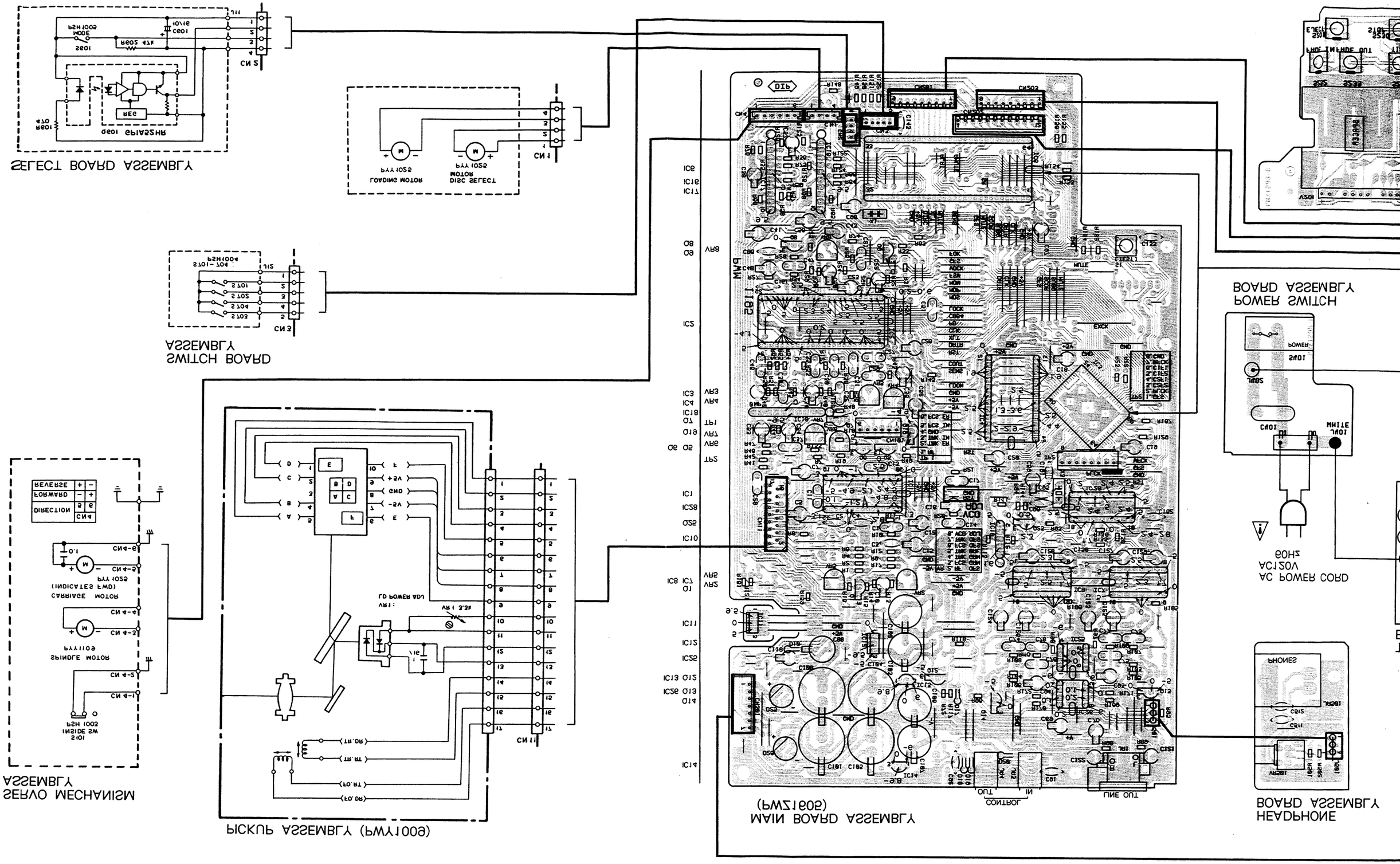
This P. C. B. connection diagram is viewed from the foil side.

IC3

Pin No.	Voltage	Pin No.	Voltage
1	5.2	11	5.2
2	5	12	5.2
3	5.2	13	5.2
4	5.2	14	0
5	5.2	15	2
6	5.2	16	0
7	2	17	0.5 – 5.2
8	5.2	18	3.6 – 5.1
9	5.2	19	0
10	0	20	5.2

IC2

Pin No.	Voltage	Pin No.	Voltage
1	0	33	0
2	5.1 – 5.2	34	2
3	0	35	5.1 – 5.2
4	0	36	5.1 – 5.2
5	0	37	2
6	2	38	2
7	2	39	0.5 – 5.2
8	0	40	0.5 – 5.2
9	4.9	41	0
10	0	42	2
11	2	43	5.2
12	0	44	5.2
13	0	45	5.2
14	0	46	5.2
15	2	47	5.2
16	5.2	48	5.2
17	2	49	2
18	0	50	0
19	0	51	0
20	0	52	0
21	0	53	0
22	0	54	0
23	0	55	0
24	0	56	0
25	0	57	0
26	0	58	0
27	0	59	0
28	0	60	0
29	0	61	0
30	0	62	0
31	0	63	0
32	0	64	0


SELECT BOARD ASSEMBLY
CN5
LOADING MOTOR
DISC SELECT MOTOR
CN1
ASSEMBLY
SWITCH BOARD
CN3
MAIN BOARD ASSEMBLY
(LWZ1602)
CONTROL
OUT
IN
LINE OUT
POWER SWITCH BOARD ASSEMBLY
AC POWER CORD
60Hz
HEADPHONE BOARD ASSEMBLY
PHONES
SERVO MECHANISM ASSEMBLY
SPINDLE MOTOR
CARRIAGE MOTOR
(INDICATES EMC)
PICKUP ASSEMBLY (LWY1005)
REVERSE
FORWARD
DIRECTION
OPEN/CLOSE
INSIDE SW

6. ELECTRICAL PARTS LIST (FOR PD-M610/KU TYPE)

NOTES :
- Parts without part number cannot be supplied.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5 %, and K = 10 %).

560 Ω → 56 × 10^1 → 561 ..... RD1/4PS 5 6 1 J
47k Ω → 47 × 10^3 → 473 ..... RD1/4PS 4 7 3 J
0.5 Ω → 0R5 ..... RN2H 0 R 5 K
1 Ω → 010 ..... RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 × 10^1 → 5621 ..... RN1/4SR 5 6 2 1 F

Miscellaneous Parts

Mark	Symbol & Description	Part No.
	Power switch board assembly	
	Switch board assembly	
	Select board assembly	
◉	Function board assembly	PWZ1613
◉	Main board assembly	PWZ1605
	Transformer board assembly	
	Headphone board assembly	
⚠	Strain relief	CM-22C
⚠	AC power cord	PDG1002
⚠	Power transformer	PTT1103
	Pickup assembly	PWY1009
	Spindle motor	PXM1001
	Motor assembly (LOADING,DISC SELECT, CARRIAGE)	PYY1025
	S101 Slide switch (INSIDE)	PSH1003
	Remote control unit	PWW1032

Power Switch Board Assembly

SWITCH

Mark	Symbol & Description	Part No.
⚠	S401 Push switch (POWER)	PSA-009

CAPACITOR

Mark	Symbol & Description	Part No.
⚠	C401 (0.01μF)	RCG-009

Switch Board Assembly

SWITCHES

Mark	Symbol & Description	Part No.
	S701 – S704 Slide switch (LOADING POSITION, MAGAZINE)	PSH1004

Select Board Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
	Q601	GP1A52HR

SWITCH

Mark	Symbol & Description	Part No.
	S601 Slide switch (MODE)	PSH1005

CAPACITOR

Mark	Symbol & Description	Part No.
	C601	CEAL100M16

RESISTORS

Mark	Symbol & Description	Part No.
	R601,R602	RD1/6PM□□□J

◉ Function Board Assembly (PWZ1613)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D201 – D210	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
	S201 – S235 Tact switch (EJECT, DISC (1–6), TRACK No. (0–10, +10, ≧20), TIME FADE EDIT, TIME, PGM, CLEAR, REPEAT, MANUAL SEARCH (◀◀, ▶▶), PLAY, RANDOM PLAY, TRACK SEARCH (⏮, ⏭), PAUSE, STOP, DELETE, AUTO FADER (IN, OUT))	PSG-065

OTHERS

Mark	Symbol & Description	Part No.
	V201 Fluorescent indicator tube	PEL1029
	Remote control sensor	GP1U52X

◉Main Board Assembly (PWZ1605)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1	CXA1081S
	IC2	CXA1082BS
	IC3	CXD1130QZ
	IC4	LH5116-15
	IC7,IC8	PCM56P-L
	IC10	M51955AL
	IC25,IC26	M5218P
	IC13	NJM78L06A
⚠	IC11	NJM7805FA
	IC14	NJM79L06A
⚠	IC12	NJM7905FA
	IC28	CXD2550P
	IC6	PD4199
⚠	IC16 – IC18	TA8410K
	Q6	DTA124ES
	Q12,Q19	DTC124ES
	Q1	2SA1399
	Q7	2SA933S
	Q25	2SC3732
	Q5,Q8,Q9	2SC1740S
	Q13,Q14	2SD1302
⚠	D26	WL02ML-5004
⚠	D25	2WL02-5008-L
	D10	1SR139-400
	D17 – D20	1SS254

SWITCH

Mark	Symbol & Description	Part No.
	S1 Tact switch (TEST MODE)	PSG-065

CAPACITORS

Mark	Symbol & Description	Part No.
	C2,C4	CCCCH300J50
	C95	CCCCH120J50
	C96	CCCCH220J50
	C191	CCCCH330J50
	C3	CCCCH390J50
	C92,C161	CCCSL101J50
	C88	CEAS101M35
	C102 – C105	CEAS102M16
	C118	CEAS220M35
	C40	CEANP4R7M25
	C16,C22	CEASR47M50
	C5,C10,C43,C69,C70	CEAS101M10
	C93,C94	CEAS220M50
	C100,C101	CEAS222M16
	C48	CEAS3R3M50
	C7,C12,C15,C18,C20,C23,C26, C36,C38,C41,C50,C52 – C54,C56, C57,C59,C97,C98,C123 – C130	CEAS330M16
	C34	CEAS4R7M50
	C19,C106,C107	CEAS471M10
	C86,C91,C133,C143	CKCYF103Z50
	C30,C51	CQMA102K50
	C14,C17,C46	CQMA103K50
	C31,C32,C35,C39	CQMA104K50
	C29	CQMA272J50
	C13	CQMA332J50
	C162	CKCYF473Z50
	C11,C21,C28,C37	CQMA333K50
	C75,C76	CQMA102J50
	C1,C27,C47	CQMA472J50
	C77,C78	CQMA183J50
	C121,C122	CQSA102J50
	C73,C74	CQMA682J50

RESISTORS

Mark	Symbol & Description	Part No.
	R30 Metal thin film	RN1/6PQ3601F
	VR2 Semi-fixed (10k)	VRTB6VS103
	VR3 – VR7 Semi-fixed (22k)	VRTB6VS223
	VR8 Semi-fixed (1k)	VRTS6VS102
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA1 2P Pin jack (OUTPUT)	PKB1009
	X3 Crystal resonator	PSS1001
	X1 Ceramic resonator	VSS1014
	JA3,JA4 Remote control jack	RKN1004

Transformer Board Assembly

CAPACITORS

Mark	Symbol & Description	Part No.
	C301,C303	CKPYF103Z50
	C302,C304 – C307	CKPYX103N25

Headphone Board Assembly

CAPACITORS

Mark	Symbol & Description	Part No.
	C511,C512	CKCYF102Z50

RESISTORS

Mark	Symbol & Description	Part No.
	VR501	PCS1003
	R501,R502	RD1/6PM470J

OTHERS

Mark	Symbol & Description	Part No.
	JA501 Headhone jack	RKN1001

7. ADJUSTMENTS

The adjustment items of this model should be performed in the order as shown below.

• Adjustment and check Items

1. Tracking offset focus offset and RF offset adjustmens
2. RF level adjustment
3. LD (Laser Diode) output power confirmation
4. Focus lock and spindle lock confirmation
5. Grating adjustment
6. Tracking balance adjustment
7. Tangential adjustment
8. Focus gain adjustment
9. Tracking gain adjustment
10. VCO free-run frequency adjustment
11. Method to confirm S character (FOCUS ERROR)

• Measuring Equipment

1. Dual trace oscilloscope
2. Laser power meter
3. Test disc (YEDS – 7)
4. Tracking balance adjustment filter
5. Loop gain adjustment filter
6. Signal generator
7. Frequency counter
8. Other general tools

• Test Mode

Test Mode setting and cancellation procedures

(1) To set the Test Mode, turn the POWER switch of the player (S401) ON pushing the TEST MODE SWITCH (S1).
(2) To canacel the Test Mode, simply turn the POWER switch of the player OFF.

The various key functions in the Test Mode are listed in Table 7-1.

• Adjustment VRs and their names

VR1 : Laser power
VR2 : RF offset (RF. OFS)
VR3 : Focus gain (FCS. GAN)
VR4 : Tracking gain (TRK. GAN)
VR5 : Tracking balance (TRK. BAL)
VR6 : Focus offset (FCS. OFS)
VR7 : Tracking offset (TRK. OFS)
VR8 : VCO adjustment (VCO. ADJ)

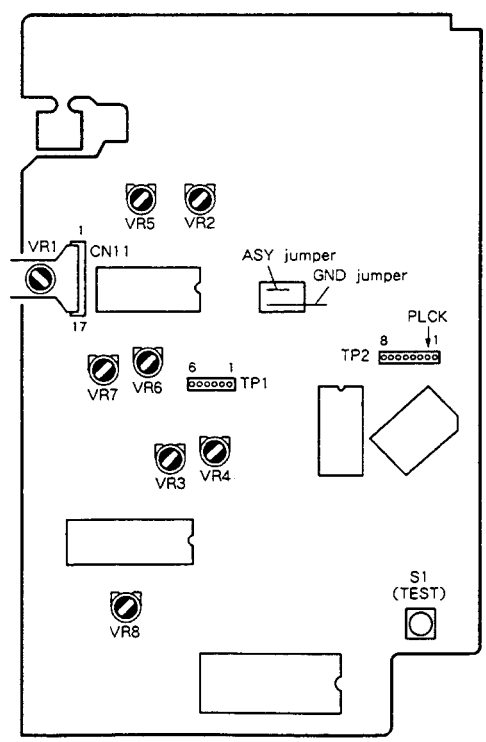
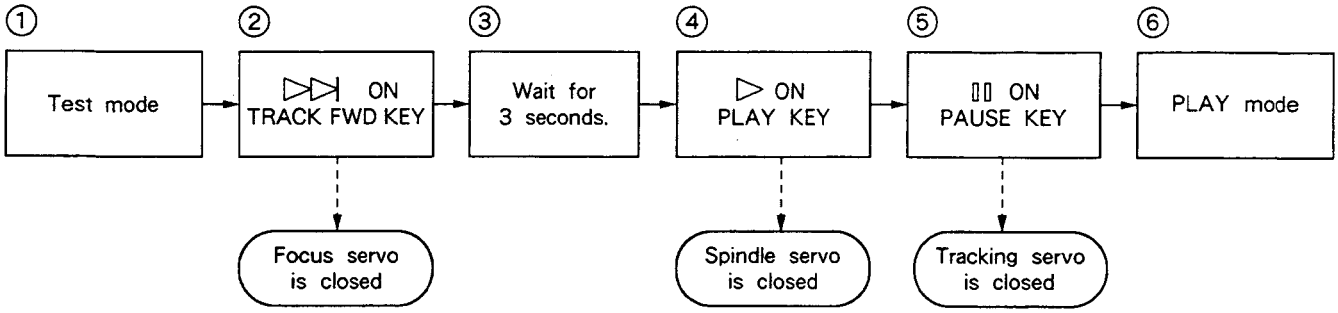


Fig. 7-1 Adjusting point

In the Test Mode each servo circuit can be closed and opened by separate operations. Consequently each servo must be closed one at a time (in serial sequence) to set PLAY mode.
Note that PLAY mode is not activated by simply pressing the PAUSE key (▯▯) in the Test Mode.

Example : Switching from STOP to PLAY mode.

* The each servo mechanisms operate in a serial sequence in the Test Mode.



• Key Functions in Test Mode

Symbol	Key name	Function during test mode	Description
▷▷|	TRACK FWD	Focus servo is closed.	Laser diode lights up. Actuator is moved up/down, then focus servo is closed.
▷	PLAY	Spindle servo is closed.	Spindle starts to rotate and the servo is closed when it turns into the CLV-A servo mode.
▯▯	PAUSE	Tracking servo is closed/opened.	Performs toggle operation. Closing the tracking servo and becomes PLAY mode by depressing the key (Focus servo and spindle servo must be closing), and PAUSE indicator lights up. Tracking servo opens by depressing the key again.
◁◁	MANUAL SEARCH REV	Carriage moves in reverse direction. (towards disc center)	Carriage is moved towards disc center at a fast speed of about 3 cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
▷▷	MANUAL SEARCH FWD	Carriage moves in forward direction. (towards disc end)	Carriage is moved towards disc end at a fast speed of about 3 cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
□	STOP	STOP	All servos are opened.
⏏	EJECT	(CD Magazine) EJECT	CD Magazine is ejected. However, pickup does not return to the park position. Moreover, even when disc is closed the pickup remains as is.

Table 7-1

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
1	**TRACKING OFFSET, FOCUS OFFSET AND RF OFFSET ADJUSTMENT**					
			TP1 Pin 2 (TRK. ERR) TP1 Pin 6 (FCS. ERR) TP1 Pin 1 (RF OUTPUT)	VR5 (TRK. BAL) VR7 (TRK. OFS) VR6 (FCS. OFS) VR2 (RF. OFS)	Tracking offset 45° 0V ± 50mV FOCUS offset 0V ± 50mV RF offset 100mV ± 50mV	● Set to TEST mode. (See page 29.) ● Turn VR5 TRK. BAL (Tracking balance) volume clockwise 45° from the center. ● Adjust with VR7 TRK. OFS (Tracking offset) volume so that the voltage of pin 2 TRK. ERR (Tracking error) of TP1 becomes 0V ± 50mV. ● Adjust VR6 FCS. OFS (focus offset) so that the FCS. ERR (focus error) voltage at TP1 pin 6 becomes 0V ± 50mV. ● Adjust VR2 RF. OFS (RF offset) so that the RF output voltage at TP1 pin 1 becomes 100mV ± 50mV.
2	**RF LEVEL ADJUSTMENT**					
			TP1 Pin 1 (RF)	VR1 Laser power	1.5Vp-p $^{+0.2V}_{-0V}$	● Set to TEST mode. (See page 29.) ● Play TEST disc and connect probe of an oscilloscope to pin 1 RF (RF output) of TP1 and measure the P-P voltage of RF waveform. ● Adjust VR1 (Laser power) so that the value is within 1.5Vp-p $^{+0.2V}_{-0V}$.
3	**LD (LASER DIODE) OUTPUT POWER CONFIRMATION**					
					Confirmation : less than 0.13mW	● Set to TEST mode. (See page 29.) ● Press TRACK FWD key (▷▷|) and turn ON LD (laser diode). ● Place sensor of the laser power meter immediately above the object lens and confirm that the output power of the LD is less than 0.13mW.
4	**FOCUS LOCK AND SPINDLE LOCK CONFIRMATION**					
	0.5V/div	100msec /div	TP1 Pin 1 (RF output)		RF output exists Normal rotation	● Set TEST disc. ● Set to TEST mode. (See page 29.) ● Shift the pickup close to the center of the disc by pressing the MANUAL SEARCH FWD key (▷▷). * Note that this step must be performed. ● Observe pin 1 RF (RF output) of TP1 with an oscilloscope and confirm that the RF signal is output after pressing the TRACK FWD key (▷▷|). ● Press PLAY key (▷) and be sure that the disc rotates in normal direction at almost the specified spped (as it is close to the center of the disc, the rotating speed is around 300 rpm) and not rotates abnormally or inversely.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
5	**GRATING ADJUSTMENT**					
						● Set to TEST mode. (See page 29.) ● Shift the pickup close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷) so that the grating adjustment screw of the pickup can be seen through the oval hole of the upper side of the servo mechanism. ● Insert the ⊖ screwdriver into the adjusting hole from the upper side of the mechanism as shown in Fig. 7-2, and confirm that the grating screw turns. ● Press TRACK FWD key (▷▷|) and PLAY key (▷) sequentially and close the focus servo and spindle servo. (Do not close the tracking servo.) ● Observe the waveform of pin 2 TRK. ERR (Tracking error) of TP1 with an oscilloscope. At this point, insert a 4kHz cutoff low-pass filter. (Fig. 7-3)
	0.5V/div	5msec /div	TP1 Pin 2 (TRK. ERR)	Grating	Null point	● Turn the ⊖ screwdriver and find null point. (Photo. 7-1)
				Grating	Maximum amplitude	● Then, turn slowly the ⊖ screwdriver counter clockwise from the null point and adjust at the point where the waveform (Tracking error signal) firstly becomes maximum amplitude. (See Photo. 7-2.) Note : If the ⊖ screwdriver is pressed strongly, the pickup moves toward disc center, accordingly adjustment becomes difficult. ● Finally, be sure to confirm that the tracking error signal (at this time, 4kHz of cutoff low-pass filter is not inserted) when the pickup is moved toward the disc center and the P-P voltage of the tracking error signal at the outer circumference of the disc are not varied greatly. When the level is deviated over ± 10%, adjust again by turning grating screw to the maximum error amplitude point.

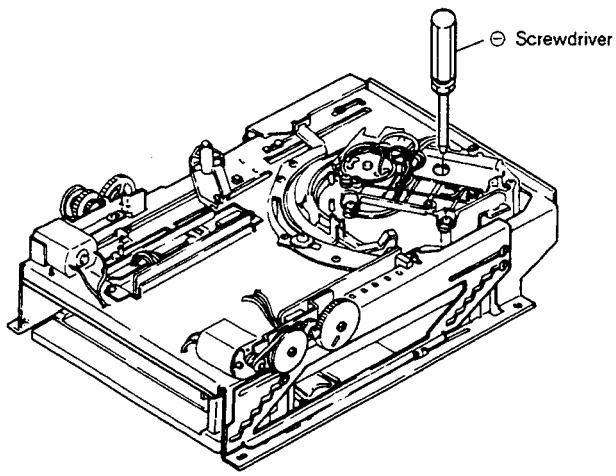


Fig. 7-2

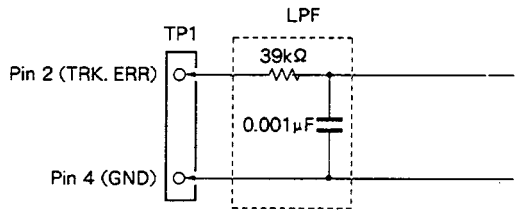


Fig. 7-3

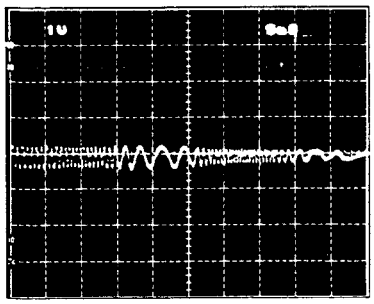


Photo 7-1
Null point

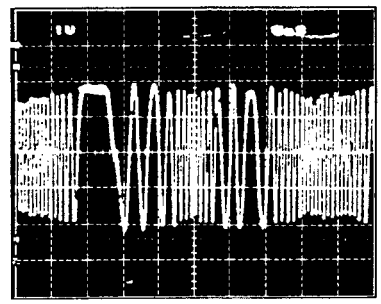


Photo 7-2
Maximum amplitude

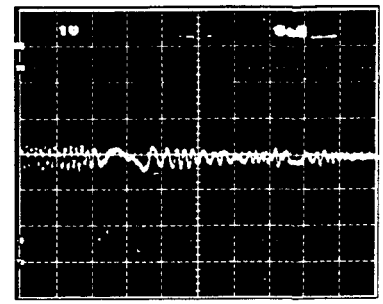
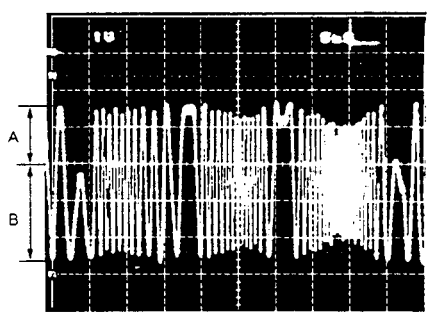


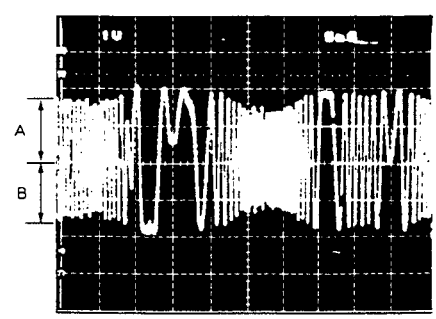
Photo 7-3
This is not the null-point waveform.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
6	**TRACKING BALANCE ADJUSTMENT**					
	0.5V/div	5msec /div	TP1 Pin 2 (TRK. ERR)	VR5 (TRK. BAL)	(TRK. ERR)	● Set the TEST disc. ● Set to TEST mode. (See page 29.) ● Shift the carriage close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷). ● Press TRACK FWD key (▷▷|), and PLAY key (▷) to start turning the disc. ● Observe pin 2 TRK. ERR (Tracking error) of TP1 with an oscilloscope and adjust with VR5 (TRK. BAL (Tracking balance) volume so that the DC component of the tracking error disappears. Note : Before proceeding with the above adjustments, be sure to adjust the tracking error offset.



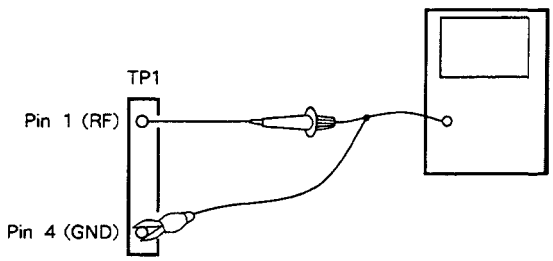
A ≠ B

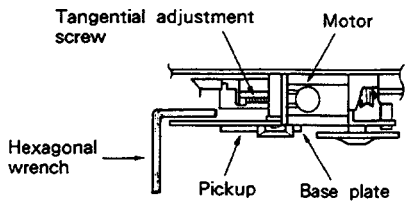
Photo. 7-4 DC component exists



A = B

Photo. 7-5 DC component not exist

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
7	**TANGENTIAL ADJUSTMENT**					
		200nsec /div	TP1 Pin 1 (RF output)	Tangential adjustment screw	Best eye pattern	● Set the TEST disc. ● Set to TEST mode. (See page 29.) ● Shift the pickup close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷). ● Press TRACK FWD key (▷▷|), PLAY key (▷) and PAUSE key (▯▯) sequentially, and close all the servos. (Pause indicator lights up.) ● Observe pin 1 RF (RF output) of TP1 with an oscilloscope and adjust with the tangential screw so that the eye pattern becomes clear. (Fig. 7-4 and 7-5) ● The adjusting point is the middle point between the point where the eye pattern becomes deteriorate by turning the tangential screw clockwise and the point where the eye pattern becomes deteriorate by turning the tangential screw counterclockwise. As a criterion, observe that the overall waveform is clear and one of the diamond shapes within the eye pattern (Photo. 7-6), and adjust at as an optimum point where the diamond shape is seen relatively fine line.  Fig. 7-4 Note : During the adjustment, hold hexagonal wrench to upward so as to keep the pickup body not goes down.



In the figure below, the top and bottom is opposite to that of the actual product.

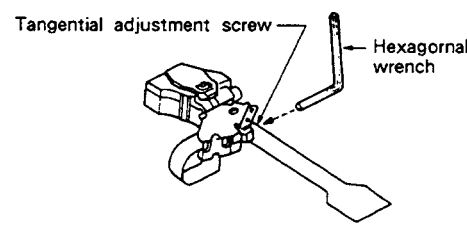
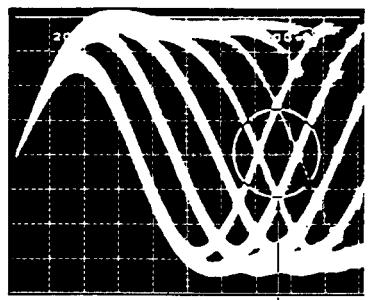
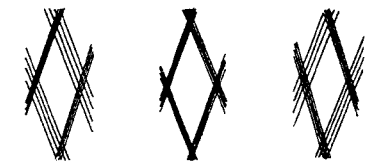


Fig. 7-5 Tangential adjustment



Part to be observed



Not optimum Optimum Not optimum

Photo 7-6

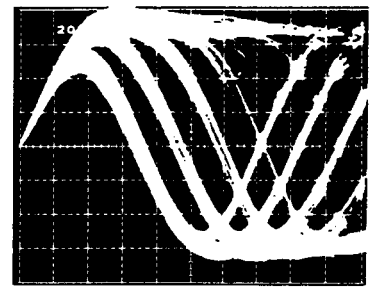


Photo 7-7

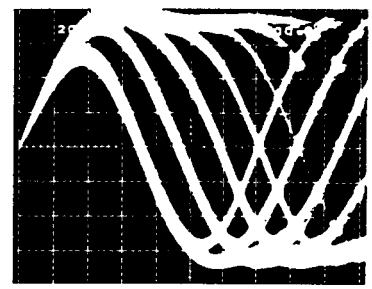


Photo 7-8

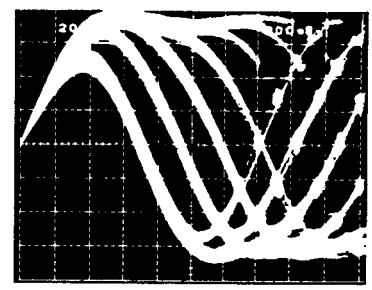


Photo 7-9

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
8	**FOCUS GAIN ADJUSTMENT**					
	20mV/div, 5mV/div. CH1 (X), CH2 (Y) (Probe 10 : 1)		X axis : TP1 Pin 5 (FCS. IN) Y axis : TP1 Pin 6 (FCS. ERR)	VR3 (FCS. GAN)	Phase difference 90°	● In the POWER OFF state, connect an oscilloscope and oscillator as shown in Fig. 7-6. ● Set the unit to the normal PLAY mode. ● Turn the POWER of oscillator ON and output 1.2kHz 2Vp-p. Note : (Depending upon oscillators, some of them output DC when their power turned ON. Therefore, it is desirable to connect oscillator after turning the power ON.) ● Adjust with VR3 FCS. GAN (Focus gain) volume so that the lissajous figure of the oscilloscope becomes horizontal circle (Phase difference 90°).

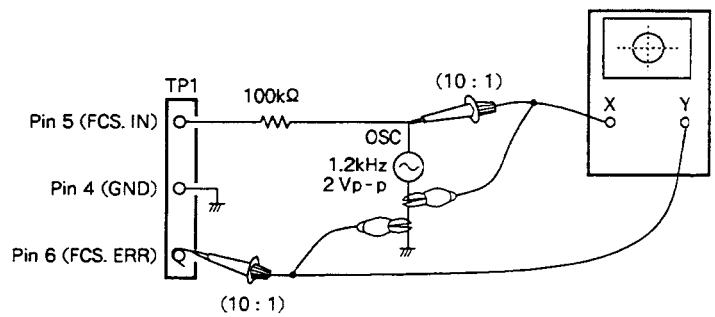


Fig. 7-6

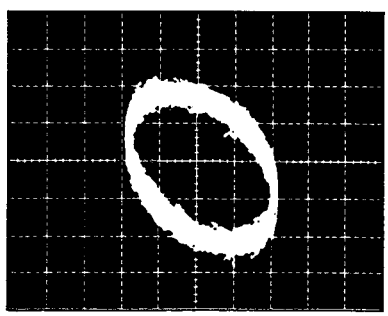


Photo. 7-10 High gain

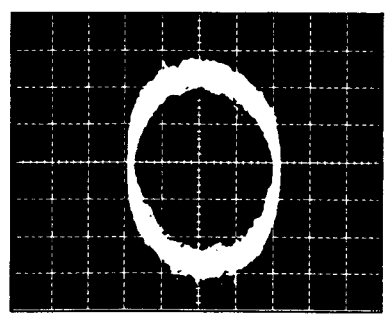


Photo. 7-11 Optimum gain

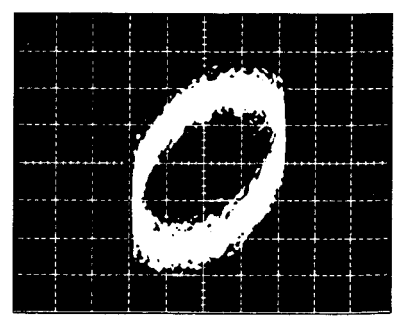


Photo. 7-12 Low gain

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
9	**TRACKING GAIN ADJUSTMENT**					
	50mV/div, 5mV/div. CH1 (X), CH2 (Y) (Probe 10 : 1)		X axis : TP1 Pin 3 (TRK. IN) Y axis : TP1 Pin 2 (TRK. ERR)	VR4 (TRK. GAN)	Phase difference 90°	● In the POWER OFF state, connect an oscilloscope and oscillator as shown in Fig. 7-7. ● Set the unit to the normal PLAY mode. ● Turn the POWER of oscillator ON and output 1.2kHz 2Vp-p. Note : (Depending upon oscillators, some of them output DC when their power turned ON. Therefore, it is desirable to connect oscillator after turning the power ON.) ● Adjust with VR4 TRK. GAN (Tracking gain) volume so that the lissajous figure of the oscilloscope becomes horizontal circle (phase difference 90°).

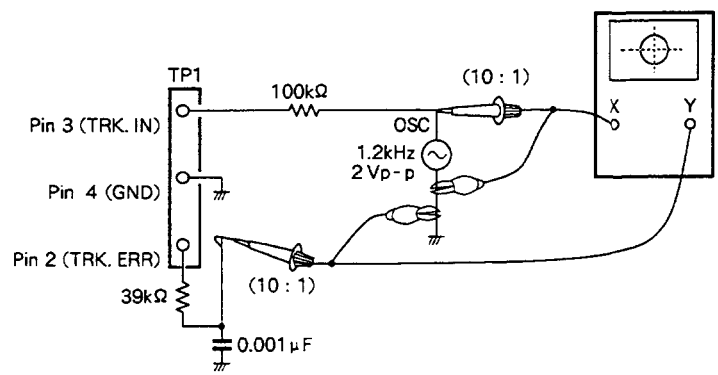


Fig. 7-7

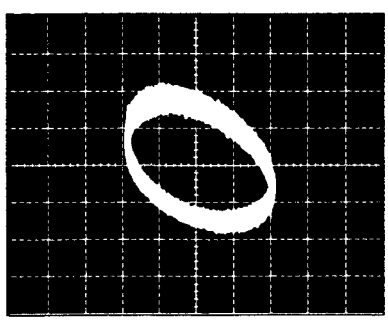


Photo. 7-13 High gain

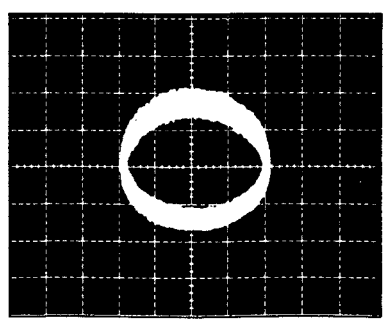


Photo. 7-14 Optimum gain

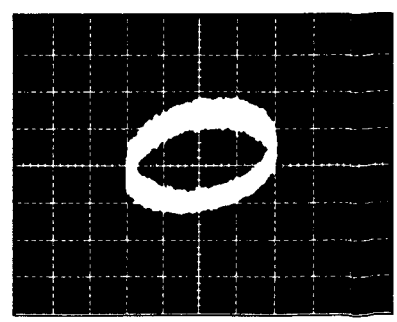


Photo. 7-15 Low gain

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
10	**VCO FREE RUN FREQUENCY ADJUSTMENT**					
			TP2 Pin 2 (PLCK)	VR8 (VCO. ADJ)	4.275 ± 0.025MHz	● Set to TEST mode. (See page 29.) ● Short-circuit between ASY and GND jumper with ⊖ screwdriver, etc. (Fig. 7-1) ● Connect frequency counter, which is measurable over 10MHz, to pin 2 of TP2 (PLCK). ● Adjust with VR8 VCO. ADJ (VCO adjustment) volume so that the value of frequency counter becomes 4.275 ± 0.025MHz.
11	**METHOD TO CONFIRM S CHARACTER (FOCUS ERROR)**					
			TP1 Pin 6 (FCS. ERR)			● Set to TEST mode. (See page 29) ● Short-circuit between pin 5 FCS. IN (Focus in) of TP1 and GND. ● Press TRACK FWD key (▷▷|) and observe the waveform of pin 6 FCS. ERR (Focus error) of TP1 at that time with an oscilloscope.

7. RÉGLAGES

Les réglages pour ce modèle doivent être réalisés dans l'ordre indiqué ci-dessous.

• Réglages et vérifications à effectuer

1. Réglages de l'offset de centrage de piste, de l'offset de focalisation et de l'offset RF.
2. Réglage du niveau RF
3. Vérification de la puissance de sortie de la diode laser (LD)
4. Vérification du verrouillage de focalisation et du verrouillage de moyeu
5. Réglage du réseau
6. Réglage de l'équilibrage de centrage de piste
7. Réglage tangentiel
8. Réglage du gain de focalisation
9. Réglage du gain de centrage de piste
10. Réglage de la fréquence propre du VCO
11. Methode de contrôle de la caractéristique S (erreur de focalisation)

• Matériel de mesure

1. Oscilloscope double trace
2. Appareil de mesure pour puissance laser
3. Disque d'essai (YEDS – 7)
4. Filtre de réglage pour équilibrage de centrage de piste
5. Filtre de réglage pour gain de boucle
6. Générateur de signal
7. Fréquencemètre
8. Outillage général divers

• Mode d'essai

Méthodes de réglage et d'annulation du mode d'essai

(1) Pour régler le mode d'essai, placer l'interrupteur d'alimentation (POWER) du lecteur (S401) sur la position de marche (ON) en appuyant sur l'interrupteur de mode d'essai (TEST MODE SWITCH) (S1).

(2) Pour annuler le mode d'essai, amener simplement l'interrupteur d'alimentation (POWER) du lecteur sur la position d'arrêt (OFF).

Les différentes fonctions des touches dans le mode d'essai sont indiquées dans le tableau 7-1.

• Dispositifs d'ajustement et no menclature

VR1 : Puissance laser
VR2 : Offset RF (RF. OFS)
VR3 : Gain de focalisation (FCS. GAN)
VR4 : Gain de centrage de piste (TRK. GAN)
VR5 : Equilibrage de centrage de piste (TRK. BAL)
VR6 : Décalage de focalisation (FCS. OFS)
VR7 : Décalage de centrage de piste (TRK. OFS)
VR8 : Réglage du VCO (VCO. ADJ)

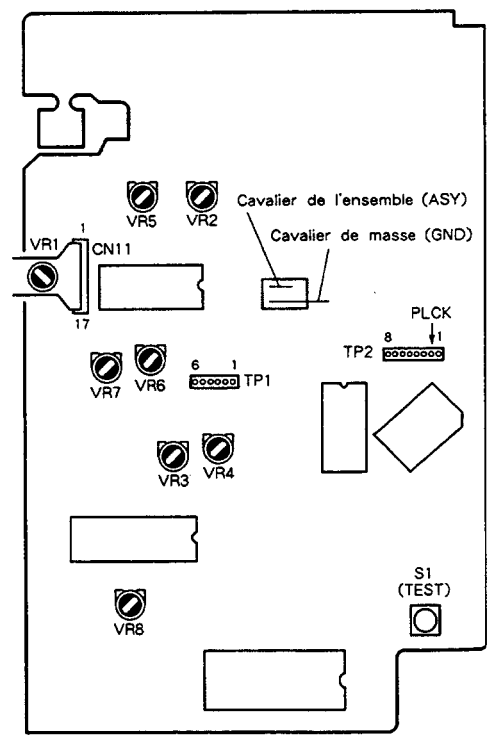


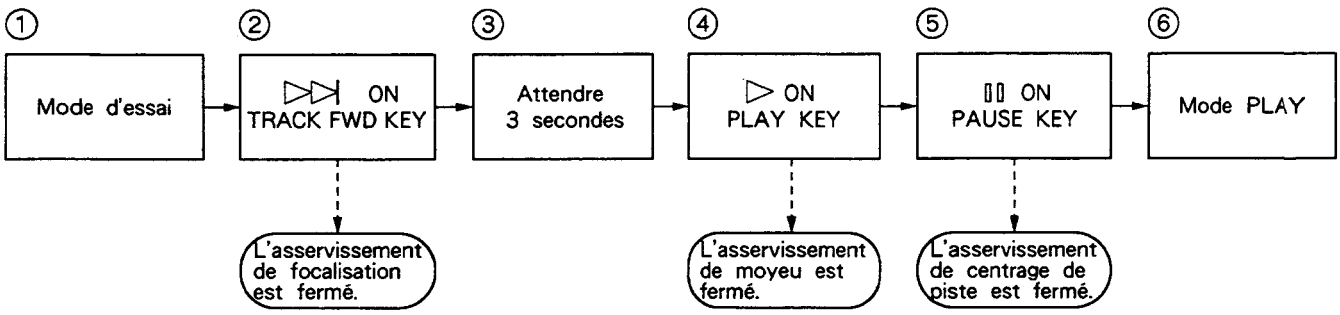
Fig. 7-1 Point de réglage

Dans le mode d'essai (Test Mode), chaque circuit asservi peut être fermé ou ouvert au moyen d'opérations séparées. En conséquence, les asservissements doivent être fermés l'un après l'autre (séquentiellement) pour régler le mode de lecture (PLAY).

Note : Le mode de lecture (PLAY) n'est pas simplement mis en oeuvre par l'enfoncement de la touche PAUSE (▯▯) dans le mode d'essai.

Exemple : Commutation du mode d'arrêt (STOP) au mode de lecture (PLAY).

* Dans le mode d'essai (Test Mode), chaque servo-mécanisme agit séquentiellement.



• Fonction des touches dans le mode d'essai (Test Mode)

Symbole	Désignation de touche	Fonction pendant le mode d'essai	Description
▷▷|	TRACK FWD	Asservissement de focalisation fermé.	La diode laser s'allume. Le moteur d'asservissement se déplace vers le haut/bas, puis l'asservissement de focalisation est fermé.
▷	PLAY	Asservissement de moyeu fermé.	Le moyeu commence à tourner et l'asservissement est fermé lorsqu'il passe dans le mode CLV-A.
▯▯	PAUSE	Asservissement de centrage de piste ouvert/fermé	Réalise l'opération de bascule. Fermeture de l'asservissement de centrage de piste et passage en mode de lecture (PLAY) en appuyant sur la touche (l'asservissement de focalisation et l'asservissement de moyeu doivent de fermer); le voyant de PAUSE s'allume. L'asservissement de centrage de piste s'ouvre par une nouvelle pression sur la touche.
◁◁	MANUAL SEARCH REV	Le chariot se déplace en arrière (vers le centre du disque).	Le chariot se déplace vers le centre du disque à une vitesse élevée d'environ 3 cm/s. Comme il n'y a pas de dispositif de sécurité, relâcher la touche dès que le chariot arrive en fin de course.
▷▷	MANUAL SEARCH FWD	Le chariot se déplace en avant (vers le centre du disque).	Le chariot se déplace vers la fin du disque à la vitesse élevée d'environ 3 cm/s. Comme il n'y a pas de dispositif de sécurité, relâcher la touche dès que le chariot arrive en fin de course.
□	STOP	Arrêt	Tous les asservissements sont ouverts.
⏏	EJECT	Ejection du magasin de clisque compact	Le magasin du disque compact est éjecté. Néanmoi, la tête de lecture ne revient pas sur sa position de repos. De plus, même lorsque le disque est enfermé, la tête de lecture demeure tel quel.

Tableau 7-1

Pas No.	Réglage de l'oscilloscope V	Réglage de l'oscilloscope H	Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Methode de réglage
1	**RÉGLAGES DE L'OFFSET DE CENTRAGE DE PISTE, DE L'OFFSET DE FOCALISATION ET DE L'OFFSET RF**					
				VR5 (TRK. BAL)	Offset de centrage de piste 45°	● Régler le mode d'essai (TEST). (Voir page 39.) ● Tourner le potentiomètre VR5 TRK. BAL (équilibrage de centrage de piste) de 45° depuis le centre dans le sens des aiguilles d'une montre.
			TP1 Broche 2 (TRK. ERR)	VR7 (TRK. OFS)	0V ± 50mV	● Ajuster le potentiomètre VR7 TRK. OFS (décalage de centrage de piste) de facon à ce que la tension à la broche 2 TRK. ERR (erreur de centrage de piste) de TP1 devienne égale à 0 V ± 50 mV.
			TP1 Broche 6 (FCS. ERR)	VR6 (FCS. OFS)	Offset de focalisation 0V ± 50mV	● Régler VR6 FCS. OFS (offset de focalisation) de manière à ce que la tensiton de FCS. ERR (erreur de focalisation) relevée sur la broche 6 de TP1 soit de 0 V ± 50 mV.
			TP1 Broche 1 (RF OUTPUT)	VR2 (RF. OFS)	Offset RF 100mV ± 50mV	● Régler VR2 RF. OFS (offset RF) de manière à ce que la tension de RF OUTPUT (sortie RF) relevée sur la broche 1 de TP1 soit de 100 mV ± 50 mV.
2	**RÉGLAGE DU NIVEAU RF**					
			TP1 Broche 1 (RF)	VR1 Puissance laser	1,5 Vc-c $^{+0,2V}_{-0V}$	● Régler le mode d'essai (TEST). (Voir page 39.) ● Reproduire le disque d'essai (TEST) et raccorder la sonde d'un oscilloscope à la broche 1 RF (sortie RF) de TP1 et mesurer la tension C-C de la forme d'onde RF. ● Régler VR1 (puissance laser) de façon que la tension soit de 1,5 Vc-c $^{+0,2V}_{-0V}$.
3	**VÉRIFICATION DE LA PUISSANCE DE SORTIE DE LA DIODE LASER (LD)**					
					Confirmation : moins de 0,13mW	● Régler le mode d'essai (TEST). (Voir page 39.) ● Appuyer sur la touche de centrage de piste arrière (TRACK FWD) (▷▷|) et enclencher la diode laser (LD). ● Placer la capteur de l'instrument destiné à mesurer la puissance laser au dessus de l'objectif et vérifier que la puissance de sortie de la diode laser (LD) est inférieure à 0,13 mW.
4	**VÉRIFICATION DU VERROUILLAGE DE FOCALISATION ET DU VERROUILLAGE DE MOYEU**					
	0,5V/div	100msec / div	TP1 Broche 1 (Sortie RF)		Présence de sortie RF Rotation normale	● Mettre en place le disque d'essai (TEST). ● Régler le mode d'essai (TEST). (Voir page 39.) ● Déplacer la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche [MANUAL SEARCH FWD (▷▷)]. * Cette étape doit absolument être réalisée. ● Observer le signal RF à la broche 1 de TP 1 (sortie RF) au moyen d'un oscilloscope et vérifier que le signal RF sorte après l'enfoncement de la touche d'avance de piste TRACK FWD (▷▷|). ● Appuyer sur la touche de lecture (PLAY) (▷) et s'assurer que le disque tourne en sens normal avec approximativement la vitesse spécifiée (étant près du centre du disque, la vitesse de rotation est d'environ 300 tr/mn), sans anomalie ni inversion du sens de rotation.

Pas No.	Réglage de l'oscilloscope V	Réglage de l'oscilloscope H	Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
5	**RÉGLAGE DE LA MIRE**					
						● Régler le mode d'essai (TEST). (Voir page 39.) ● Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (▷▷). de façon à ce que la vis de réglage du réseau de la tête de lecture puisse être vue à travers le trou oval situé à la partie supérieure de l'asservissement. ● Insérer un ⊖ tournevis dans le trou de réglage depuis la partie supérieure du mécanisme, comme illustré à la figure 7-2, puis vérifier que la vis de réseau tourne. ● Appuyer séquentiellement sur les touches de piste avant TRACK FWD (▷▷|) et de lecture (PLAY) (▷), et fermer les asservissements de focalisation et de moyeu. (Ne pas fermer l'asservissement de centrage de piste.) ● Observer la forme d'onde à la broche 2 TRK. ERR (erreur de centrage de piste) de TP1 au moyen d'un oscilloscope. Introduire alors un filtre de coupure passe-bas 4 kHz. (Figure 7-3)
	0,5V/div	5msec /div	TP 1 Broche 2 (TRK. ERR)	Réseau Réseau	Point zéro Amplitude maximum	● Faire touner un ⊖ tournevis et rechercher le point zéro. (Photo 7-1) ● Tourner ensuite lentement dans le sens contraire des aiguilles d'une montre le ⊖ tournevis depuis le point zéro et l'ajuster sur le point où la forme d'onde (signal d'erreur de centrage de piste) présente une première amplitude maximum. (Voir photo 7-2.) Note : Si le ⊖ tournevis est appuyé avec force, la tête de lecture se déplace vers le centre du disque et le réglage devient difficile à effectuer. ● Finalement, s'assurer que le signal d'erreur de centrage de piste (cette fois-ci le filtre de coupure passe-bas à 4kHz n'est pas introduit) n'a pas beaucoup varié lorsque la tête de lecture est déplacée vers le centre du disque, et aussi que la tension C-C du signal de centrage de piste n'a pas non plus beaucoup varié sur la circonférence extérieure du disque. Lorsque le niveau varie de plus de ±10 %, recommencer le réglage en tournant la vis de réseau jusqu'au point d'amplitude d'erreur maximum.

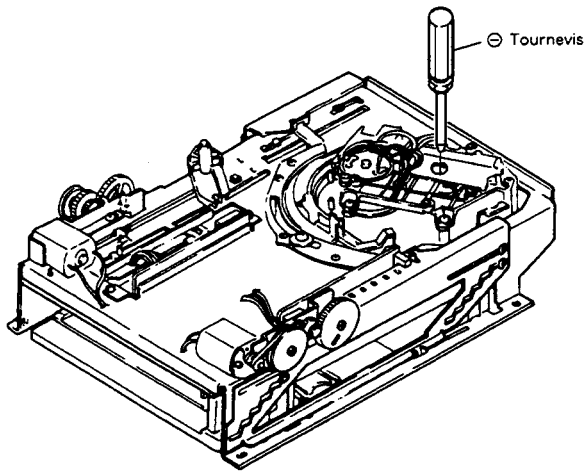


Fig. 7-2

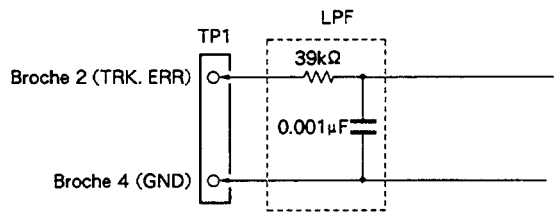


Fig. 7-3

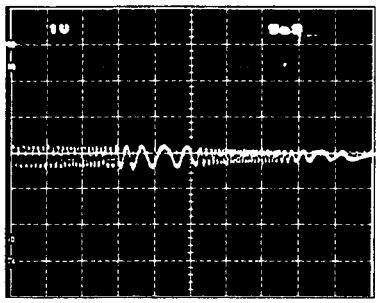


Photo 7-1
Point zéro

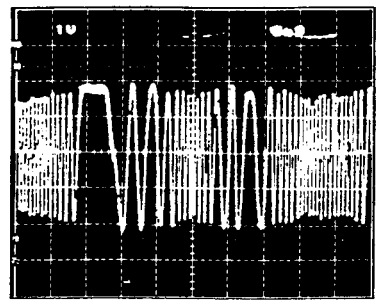


Photo 7-2
Amplitude maximum

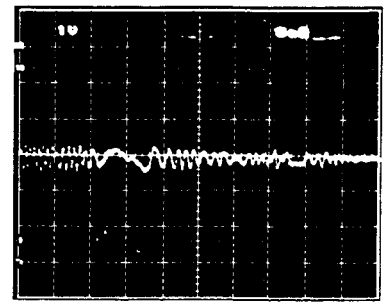
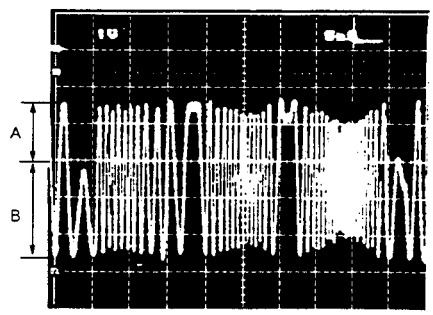


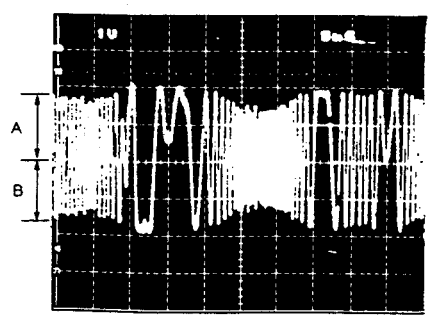
Photo 7-3
Forme d'onde hors du point zéro

Pas No.	Réglage de l'oscilloscope V	Réglage de l'oscilloscope H	Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
6	**RÉGLAGE DE L'EQUILIBRAGE DE CENTRAGE DE PISTE**					
	0,5V/div	5msec /div	TP1 Broche 2 (TRK. ERR)	VR5 (TRK. BAL)	TRK. ERR	● Mettre en place le disque d'essai (TEST). ● Régler le mode d'essai (TEST). (Voir page 39.) ● Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (▷▷). ● Appuyer sur la touche de piste avant (TRACK FWD) (▷▷|) et sur la touche de lecture (PLAY) (▷) pour faire tourner le disque. ● Observer la broche 2 TRK. ERR (erreur de centrage de piste) de TP1 au moyen d'un oscilloscope et ajuster au moyen de potentiomètre VR5 TRK. BAL (équilibrage de centrage de piste) de façon à ce que la composante continue de l'erreur de centrage de piste disparaisse. Note : Avant de procéder aux ajustements ci-dessus, veiller à régler le décalage d'erreur de piste.



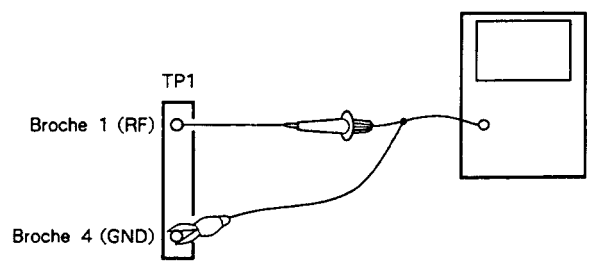
A ≠ B

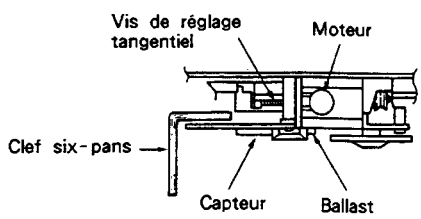
Photo. 7-4 Présence de la composante continue



A = B

Photo. 7-5 Absence de la composante continue

Pas No.	Réglage de l'oscilloscope V	Réglage de l'oscilloscope H	Points d'essai	Pointe de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
7	**RÉGLAGE TANGENTIEL**					
		200nsec / div	TP1 Broche 1 (sortie RF)	Vis de réglage tangentiel	Mire Best Eye	● Mettre en place le disque d'essai (TEST) ● Régler le mode d'essai (TEST). (Voir page 39.) ● Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (▷▷). ● Appuyer séquentiellement sur les touches d'avance de piste (TRACK FWD) (▷▷|), de lecture (PLAY) (▷) et de pause (PAUSE) (▯▯), et fermer tous les asservissements. (Le voyant de pause s'allume.) ● Observer le signal RF à la broche 1 (sortie RF) de TP1 au moyen d'un oscilloscope et régler au moyen de la vis tangentielle, de façon à ce que la mire Best Eye devienne claire. (Figure 7-4 et 7-5) ● Le point de réglage se situe au milieu entre le point ou la mire se détériore en tournant la vis tangentielle dans le sens des aiguilles d'une montre et le point où la mire se détériore en tournant la vis tangentielle dans le sens inverse des aiguilles d'une montre. Comme critère, observer que la forme d'onde globale soit claire et que l'une des formes de losange se situe dans la mire (Photo 7-6) ; réaliser le réglage en un point optimum où la forme de losange apparaît avec des traits relativement fins.  Fig. 7-4 Note : Pendant le réglage, tenir la clef six-pans vers le haut de façon à ce que le corps de la tête de lecture ne descende pas.



Dans l'illustration ci-dessous, le dessus et le dessous de l'appareil sont en réalité à l'envers.

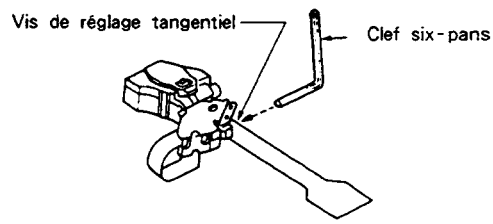
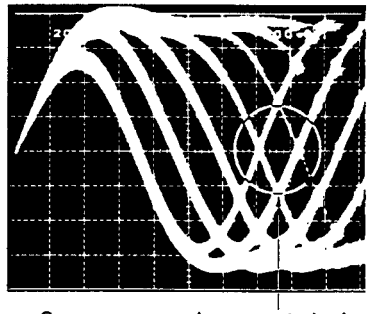
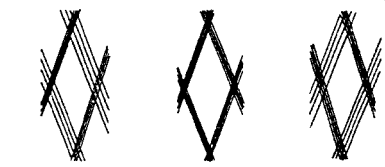


Fig. 7-5 Réglage tangentiel



Concentre sur la netteté du losange



Insatisfaisant Optimal Insatisfaisant

Photo 7-6

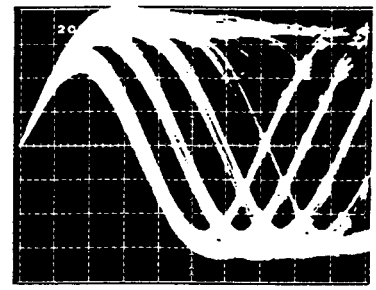


Photo 7-7

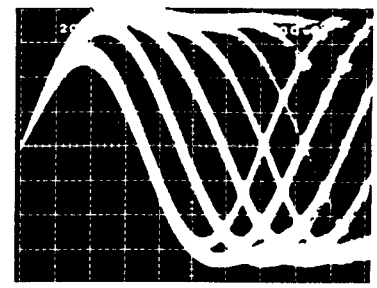


Photo 7-8

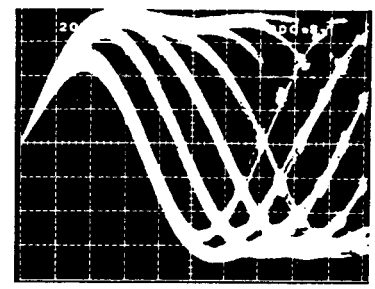


Photo 7-9

Pas No.	Réglage de l'oscilloscope V	Réglage de l'oscilloscope H	Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
8	**RÉGLAGE DU GAIN DE FOCALISATION**					
	20mV/div, 5mV/div. Canal 1 (X), Canal 2 (Y) (Sonde 10:1)		Axe X : TP1 Broche 5 (FCS. IN) Axe Y : TP1 Broche 6 (FCS. ERR)	VR3 (FCS. GAN)	Différence de phase 90°	● L'alimentation étant coupée (POWER OFF), raccorder un oscilloscope et un oscillateur de la manière indiquée à la figure 7-6. ● Régler l'appareil en mode de lecture normale. ● Enclencher l'alimentation de l'oscillateur et délivrer un signal de 1,2 kHz a 2 Vc-c. Note : (En fonction de l'oscillateur utilisé, certains appareils fournissent un courant continu lors de leur enclenchement. Par conséquent, il est préférable de raccorder l'oscillateur après avoir enclenché son alimentation.) ● Ajuster le potentiomètre VR3 FCS. GAN (gain de focalisation) de façon à ce que la figure de Lissajou observée sur l'osciloscope devienne un cercle horizontal (déphasage 90°).

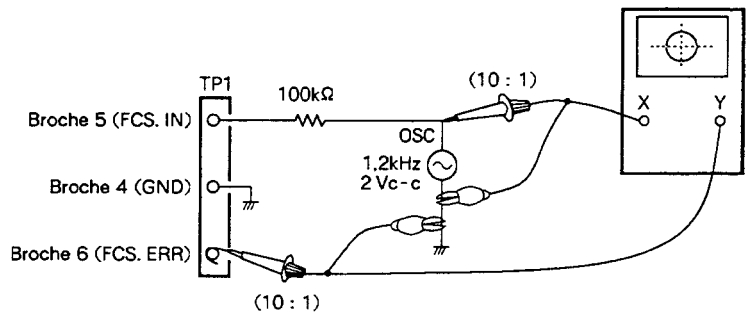


Fig. 7-6

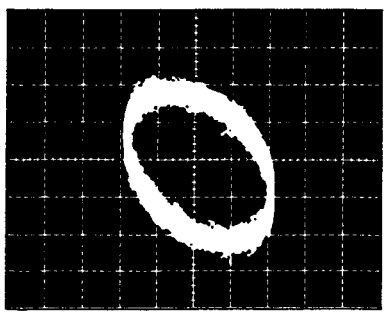


Photo. 7-10 Gain élevé

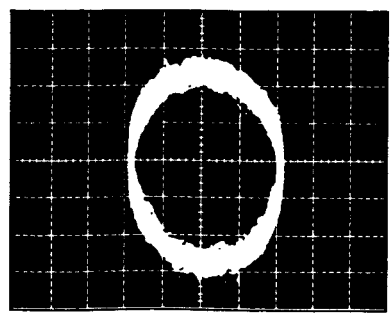


Photo. 7-11 Gain optimum

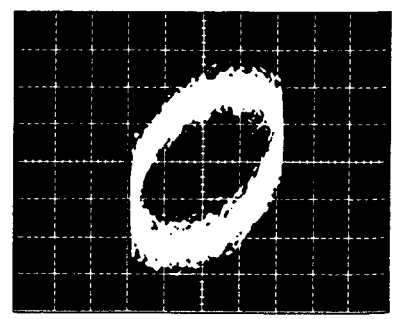


Photo. 7-12 Gain réduit

Pas No.	Réglage de l'oscilloscope V	Réglage de l'oscilloscope H	Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
9	**RÉGLAGE DU GAIN DE CENTRAGE DE PISTE**					
	50mV/div, 5mV/div. Canal 1 (X), Canal 2 (Y) (Sonde 10 : 1)		Axe X : TP1 Broche 3 (TRK. IN) Axe Y : TP1 Broche 2 (TRK. ERR)	VR4 (TRK.GAN)	Déphasage 90°	● L'alimentation étant coupée (POWER OFF), raccorder un oscilloscope et un oscillateur de la manière indiquée à la figure 7-7. ● Régler l'appareil en mode de lecture normale. ● Enclencher l'alimentation de l'oscillateur et fournir un signal de 1,2 kHz à 2 Vc-c. Note : (En fonction de l'oscillateur utilisé, certains appareils fournissent un courant continu lors de leur enclenchement. Par conséquent, il est préférable de raccorder l'oscillateur après avoir enclenché son alimentation.) ● Ajuster le potentiomètre VR4 TRK GAN (gain de centrage de piste) de façon à ce que la figure de Lissajou sur l'oscilloscope devienne un cercle horizontal (déphasage 90°).

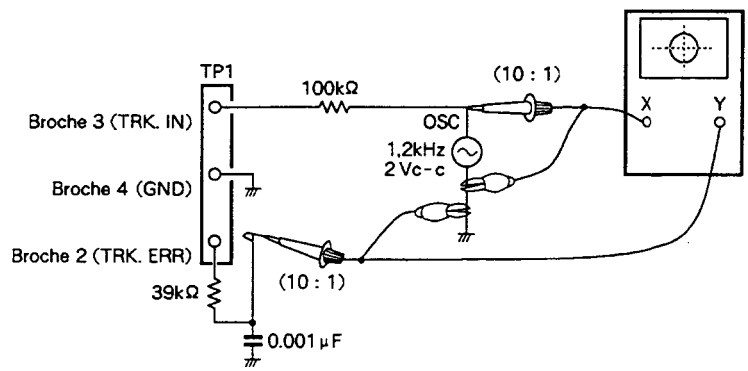


Fig. 7-7

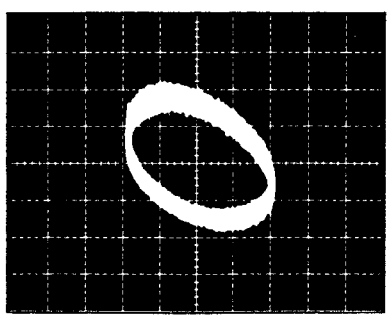


Photo. 7-13 Gain élevé

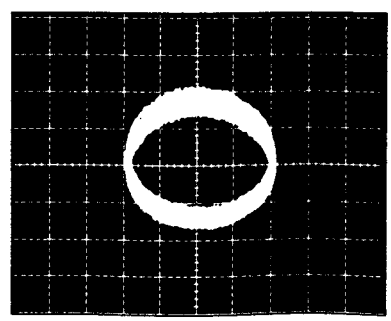


Photo. 7-14 Gain optimum

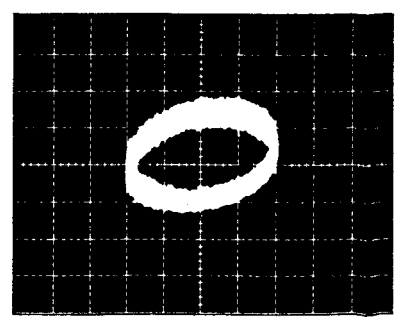


Photo. 7-15 Gain réduit

Pas No.	Reglage de l'oscilloscope V	Reglage de l'oscilloscope H	Points d'essai	Points de réglage	Points de contrôle / spécifications de réglage	Méthode de réglage
10	**RÉGLAGE DE LA FRÉQUENCE PROPRE DU VCO**					
			TP2 Broche 2 (PLCK)	VR8 (VCO. ADJ)	4,275 ± 0,025MHz	● Régler le mode d'essai (TEST). (Voir page 39) ● Court-circuiter entre les ponts ASY et GND un ⊖ tournevis, etc. (Figure 7-1) ● Reccorder un fréquencemètre capable de mesurer audessus de 10 MHz à la broche 2 de TP2 (PLCK). ● Ajuster le potentiomètre VR8 VCO ADJ (réglage du VCO) de façon à ce que la valeur indiquée par le fréquencemètre devienne égale à 4,275 ± 0,025MHz.
11	**MÉTHODE DE CONTRÔLE DE LA CARACTÉRISTIQUE S (ERREUR DE FOCALISATION)**					
			TP1 Broche 6 (FCS. ERR)			● Régler le mode d'essai (TEST). (Voir page 39.) ● Réaliser un court-circuit entre la broche 5 FCS. IN (entrée de focalisation) de TP1 et la terre GND. ● Appuyer sur la touche d'avance de piste (TRACK FWD) (▷▷|) et observer simultanément la forme d'onde à la broche 6 FCS . ERR (erreur de focalisation) de TP1 au moyen d'un oscilloscope.

7. AJUSTE

Los items de ajuste de este modelo deberán ser efectuados en el orden mostrado abajo.

• Itemes de ajuste y comprobación

1. Ajuste de desviación de seguimiento, foco y RF.
2. Ajuste del nivel de RF
3. Confirmación de la alimentación de salida de LD (diodo láser)
4. Confirmación de enclavamiento del enfoque y del eje
5. Ajuste del retículo
6. Ajuste del equilibrio de seguimiento
7. Ajuste tangencial
8. Ajuste de la ganancia de enfoque
9. Ajuste de la ganancia de seguimiento
10. Ajuste de la frecuencia propia de VCO
11. Método para confirmar el carácter S (error de enfoque)

• Equipo de medición

1. Osciloscopio de doble traza
2. Medidor de alimentación del láser
3. Disco de prueba (YEDS-7)
4. Filtro de ajuste de equilibrio de seguimiento
5. Filtro de ajuste de ganancia de bucle
6. Generador de senñal
7. Contador de frecuencia
8. Otras herramientas generales

• Modo de prueba

Ajuste del modo de prueba y los procedimientos de cancelación

(1) Para disponer el mode de prueba, coloque en ON el interruptor POWER del reproductor (S401) mientras presiona el interruptor TEST MODE (S1). (terminales del modo de ajuste).
(2) Para cancelar el modo de prueba, simplemente gire el interruptor de POWER del reproductor a OFF.

Las varias funciones de tecla en el modo de prueba están enlistadas en la Tabla 7-1.

• Tores variables (VR) de ajuste y sus nombres

VR1 : Alimentación del láser
VR2 : Compensación de RF (RF. OFS)
VR3 : Ganancia de enfoque (FCS. GAN)
VR4 : Ganancia de seguimiento (TRK. GAN)
VR5 : Equilibrio de seguimiento (TRK. BAL)
VR6 : Desviación de enfoque (FCS. OFS)
VR7 : Desviación del seguimiento (TRK. OFS)
VR8 : Ajuste de VCO (VCO. ADJ)

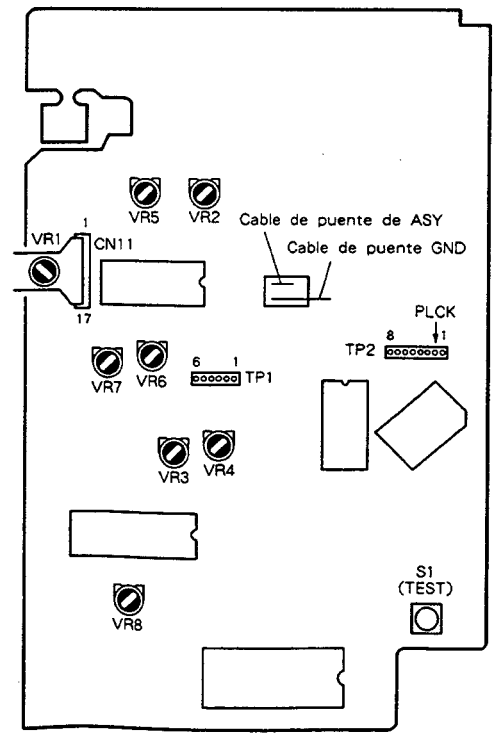
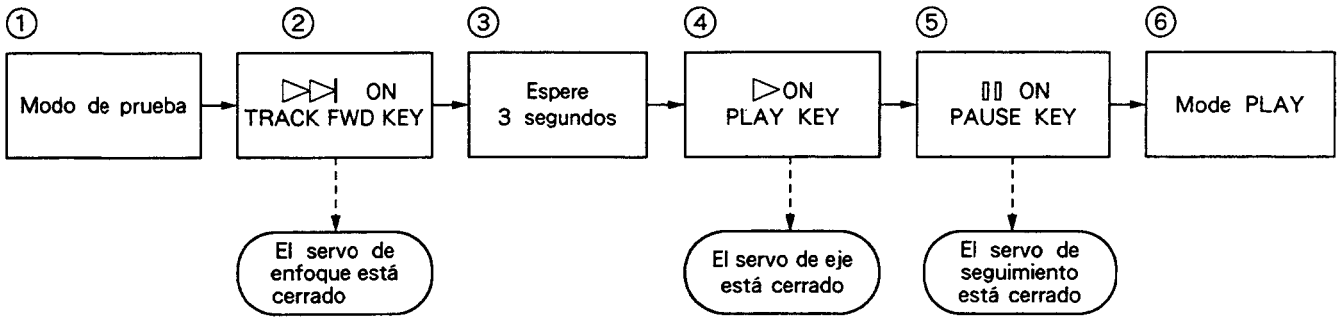


Fig. 7-1 Punto de ajuste

En el modo de prueba, cada servocircuito puede ser cerrado y abierto por operaciones separadas. Consecuentemente, cada servo deberá ser cerrado uno a la vez (en secuencia en serie) para ajustar el modo de PLAY (reproducción).
Fijese que el modo de PLAY no se activa simplemente presionando la tecla de PAUSE (pausa) (▯▯) en el modo de prueba.

Ejemplo : Conmutando del modo de STOP (parado) a PLAY.

* Cada servomecanismo funciona en una secuencia en serie en el modo de prueba.



• Funciones de tecla en el modo de prueba

Símbolo	Nombre de tecla	Función durante el modo de prueba	Descripció
▷▷|	TRACK FWD	El servo de enfoque está cerrado.	El diode láser se enciende. El actuador se mueve arriba /abajo, luego se cierra el servo de enfoque.
▷	PLAY	El servo de eje está cerrado.	El eje comienza a rotar y se cierra el servo cuando se convierte en el modo de servo CLV-A.
▯▯	PAUSE	El servo de seguimiento está carrado/abierto	Ejecuta la operatión de conexión oscilante. Cuando se cierra el servo de seguimiento y se pone en el modo de PLAY presionando esta tecla (el servo de enfoque y el del eje deberán estar cerrados), y el indicador de pausa se enciende. El servo de seguimiento se abre presionando de nuevo la tecla.
◁◁	MANUAL SEARCH REV	El carro se mueve en la dirección inversa (hacia el centro del disco)	El carro se mueve hacia el centro del disco a una alts velocidad de como 3 cm/seg. Ya que no existe un mecanismo de seguridad para detener el carro, libere la tecla cuando el carro llegue al final.
▷▷	MANUAL SEARCH FWD	El carro se mueve en la dirección hacia delante. (hacia el final del disco)	El carro se mueve hacia el final del disco a una alta velocidad de como 3 cm/seg. Ya que no existe un mecanismo de seguridad para detener el carro, libere la tecla cuando el carro llegue al final.
□	STOP	PARADO	Todos los servos están abiertos.
⏏	EJECT	(Cargador de discos compactos)	El cargador de discos compactos. Sin embargo, el captador no regresa a su posición de aparcamiento. Además, aun cuando se cierra el disco el captador permanece tal como está.

Tabla 7-1

No. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
1	**AJUSTES DE COMPENSATION DE SEGUIMIENTO, FOCO Y RF**					
			Patilla 2 de TP1 (TRK. ERR) Patilla 6 de TP1 (FCS. ERR) Patilla 1 de TP1 (RF OUTPUT)	VR5 (TRK. BAL) VR7 (TRK. OFS) VR6 (FCS. OFS) VR2 (RF. OFS)	Desviación de seguimiento 45é 0V ± 50mV Compens. de foco 0V ± 50mV Compens. de RF 100mV ± 50mV	● Ajuste el modo de TEST. (Vea la página 49.) ● Gire el volumen de TRK. BAL (Equilibrio de seguimiento) de VR5 en el sentido de las menecillas del reloj 45° del centro. ● Ajuste VR7 TRK. OFS (de seguimiento) de modo que el voltaje en TRK. ERR (desviación de seguimiento) de la patilla 2 de TP1 se ponga en 0V ± 50 mV. ● Ajuste VR6 FCS. OFS (compensación de foco) de modo que el voltaje de FCS. ERR) error de foco) en la patilla 6 de TP1 sea 0V ± 50mV. ● Ajuste VR2 RF. OFS (compensación de RF) de modo que el voltaje de salida de RF en la patilla 1 de TP1 sea 100 mV ± 50 mV.
2	**AJUSTE DEL NIVEL DE RF**					
			Patilla 1 de TP1 (RF)	Alimentación del laser VR1	1,5Vp-p $^{+0,2V}_{-0V}$	● Ajuste el mode de TEST. (Vea la página 49.) ● Reproduzca el disco de TEST y conecte la sonda de un osciloscopio a la RF de la patilla 1 (Sailda de RF) de TP1 y mida el voltaje de P-P de la forma de onda de RF. ● Ajuste VR1 (alimentación del láser) que el valor sea 1,5Vp-p $^{+0,2V}_{-0V}$.
3	**CONFIRMACION DE ALIMENTACION DE ALIDA DE LD (DIODO LASER)**					
					Confirmación Menos de 0,13mW	● Ajuste el modo de TEST. (Vea la página 49.) ● Presione la tecla de TRACK FWD (▷▷|) y encienda el LD (Diodo láser). ● Ubique el sensor del medidor de potencia del láser inmediatamente arriba del objetivo, y confirme que la potencia de salida del LD sea menos de 0,13 mW.
4	**CONFIRMACION DE BLOQUEO DE ENFOQUE Y DEL EJE**					
	0,5V/div	100mseg /div	Patilla 1 de TP1 (Salida de RF)		Existe salida de RF Rotación normal	● Ajuste del disco de TEST. ● Ajuste del mode de TEST. (Vea la página 49.) ● Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷▷). * Tenga en cuenta que este paso deberá ser ejecutado. ● Observe RF (Radio frecuencia) de la patilla 1 de TP1 con un osciloscopio y confirme que se saque la senñal de RF después de presionar la tecla de TRACK. ERR (▷▷|). ● Presione la tecla de PLAY (▷) y asegúrese que el disco rota en la dirección normal casi a la velocidad especificada (tal como está cerca del centro del disco, la velocidad de rotación es alrededor de 300 rpm) y que no rote anormalmente o inversamente.

No. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
5	**AJUSTE DE LA MIRA**					
						● Ajuste el mode TEST. (Vea la página 49.) ● Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷▷) de modo que el tornillo de ajuste de retículo del captador pueda ser visto a través del orificio oval en el lado superior del servomecanismo. ● Inserte un ⊖ destornillador en el orificio del lado superior or del mecanismo come se muestra en la Fig. 7-2, y confirme que gira el tornillo de retículo. ● Presione la tecla de TRACK FWD (▷▷|) y la tecla de PLAY (▷) secuencialmente y cierre el servo de enfoque y el del eje. (No cierre el servo de seguimiento.) ● Observe la forma de onda en TRCK. ERR (Error de seguimiento) de la patilla 2 de TP1 con un osciloscopio. Luego inserte un filtro de paso bajo de corte. (Fig. 7-3)
	0,5V/div	5mseg /div	Patilla 2 de TP1 (TRK. ERR)	Retículo	Punto cero	● Gire el ⊖ destornillador y encuentre el punto cero. (Foto. 7-1) ● Luego, gire lentamente el ⊖ destornillador hacia el seutido contrario del reloj desde el punto cero y ajuste en el punto donde la forma de onda (Senñal de error de seguimiento) primeramente se ponga a una amplitud máxima. (Vea Foto. 7-3) Nota : Si el ⊖ destornillador se presiona fuertemente, el captador se mueve hacia el centro del disco, por consiguiente el ajuste resulta difícil. ● Finalmente, asegúrese de confirmar que la señal de error de seguimiento (en este momento, no se ha insertado el filtro de paso bajo de corte de 4 kHz) cuando el captador se mueve hacia el centro del disco y el voltaje de P-P do la señal de error de seguimiento en la circunferencia exterior del disco no haya variado considerablemente. Cuando se desvía el nival arriba de ± 10 %, ajuste de nuevo girando el tornillo de retículo a un punto de amplitud de error mínimo.
				Retículo	Amplitud máxima	

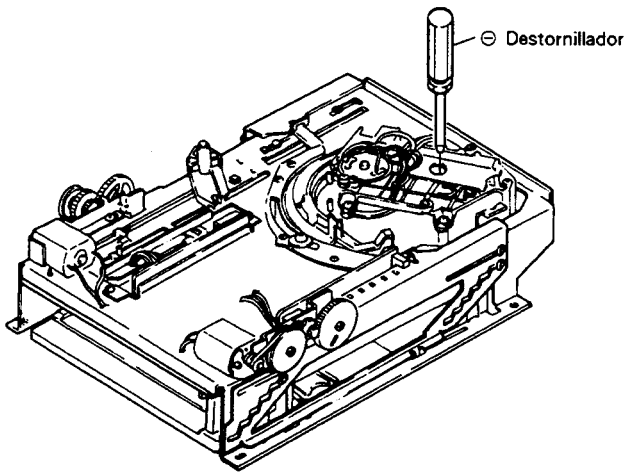


Fig. 7-2

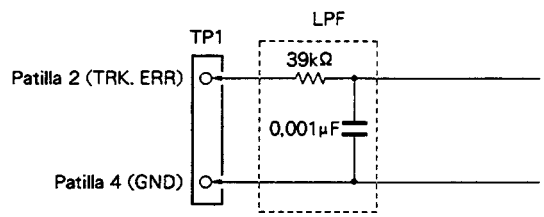


Fig. 7-3

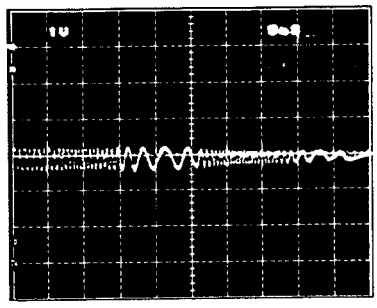


Foto 7-1
Punto cero

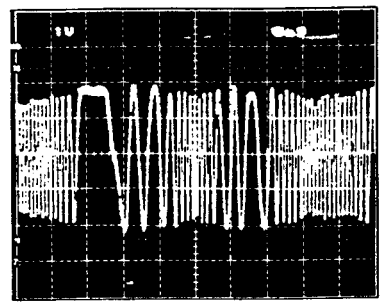


Foto 7-2
Amplitud máxima

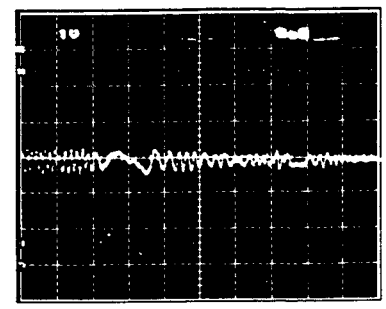
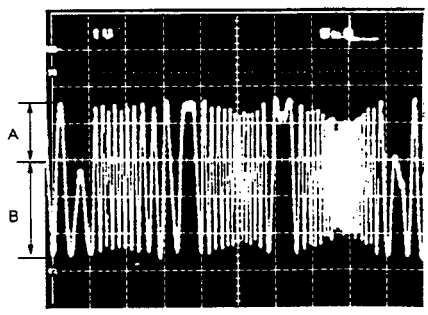


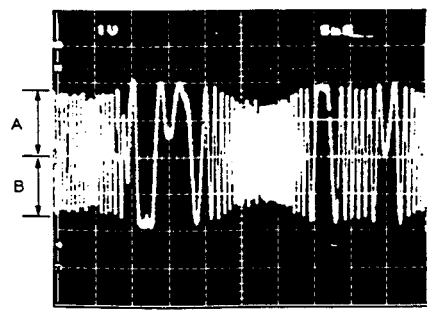
Foto 7-3
Forma de onda de un punto no cero

No. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
6	**AJUSTE DE EQUILIBRIO DE SEGUIMIENTO**					
	0.5V/div	5mseg /div	Patilla 2 de TP1 (TRK. ERR)	VR5 (TRK. BAL)	TRK. ERR	● Ajuste el disco de TEST. ● Ajuste el mode de TEST. (Vea la página 49.) ● Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷▷). ● Presione la tecla de TRACK FWD (▷▷|) y la tecla de PLAY (▷) para comenzar a voltear el disco. ● Obseve TRK. ERR (Error de sequimiento) de la patilla 2 de TP1 con un osciloscopio y ajuste con el volumen de TRK. BAL (Equilibrio de seguimiento) de VR5 de modo que la componente de CC del error de seguimiento desaparezca. Nota : Antes de realizar los ajustes indicados arriba, asegúrese de compensar el error de seguimiento.



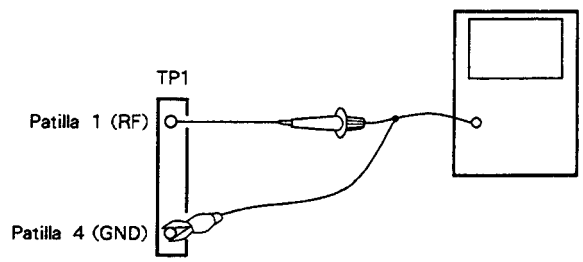
A ≠ B

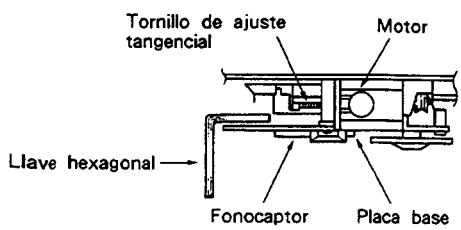
Foto. 7-4 Existe componente de CC



A = B

Foto. 7-5 No existe componente de CC

No. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
7	**AJUSTE TANGENCIAL**					
		200nseg /div	Patilla 1 de TP1 (Salida de RF)	Tornillo de ajuste de la tangencial	Mejor imagen de prueba	● Ajuste el disco de TEST. ● Ajuste el mode de TEST. (Vea la página 49.) ● Cambie el carro cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷▷). ● Presione la tecla de TRAK FWD (▷▷|), la tecla de PLAY (▷) y la tecla de PAUSE (▯▯) secuencialmente, y cierre todos los servos. (El indicador de pausa se enciende.) ● Observe el RF de la patilla 1 (Salida de RF) de TP1 con un osciloscopio y ajuste con el tornillo de la tangencial de modo que la imagen de prueba resulte nítida. (Fig. 7-4 y 7-5) ● El punto de ajuste es el punto medio entre el punto donde la imagen de prueba se deteriora girando el tornillo de la tangencial en el sentido de las manecillas del reloj, y el punto donde la imagen de prueba se deteriora girando el tornillo de la tangencial en contra del sentido de las menecillas del reloj. Como un criterio, observe que la forma de onda en conjunto sea nítida y que una de las figuras de diamante esté dentro de la imagen de prueba (Foto. 7-6), y ajuste al punto óptimo donde la forma de diamante se vea relativamente como una línea fina.  Fig. 7-4 (Nota) Durante el ajuste, sostenga la llave hexagonal hacia arriba para evitar que el cuerpo del captador vaya hacia abajo.



En la figura siguiente, las partes superior e inferior son opuestas a las del producto real.

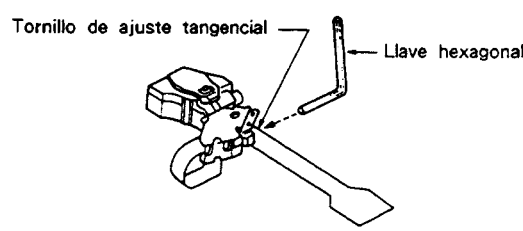
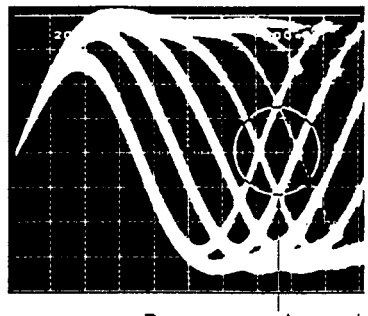
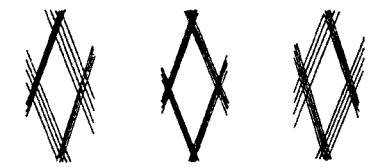


Fig. 7-5 Ajuste tangencial



Parte a ser observada



No es óptimo Óptimo No es óptimo

Foto 7-6

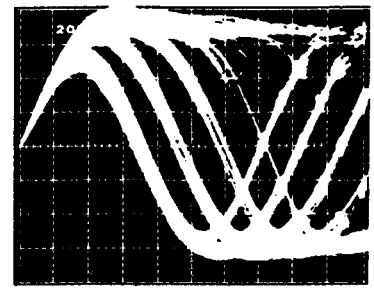


Foto 7-7

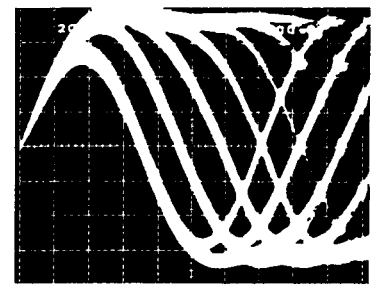


Foto 7-8

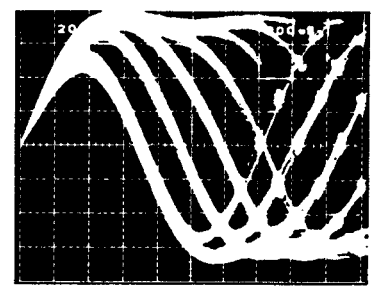


Foto 7-9

No. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
8	**AJUSTE DE GANANCIA DE ENFOQUE**					
	20mV/div, 5mV/div. CH1 (X), CH2 (Y) (SONDA 10 : 1)		Eje X : Patilla 5 de TP1 (FCS. IN) Eje Y : Patilla 6 de TP1 (FCS. ERR)	VR3 (FCS. GAN)	Diferencia de fase 90°	● En el estado de POWER OFF (apagado), conecte el osciloscopio y el oscilador como se muestra en la Fig. 7-6. ● Ponga la unidad en el modo de reproducción (PLAY) normal. ● Encienda el oscilador y extraiga 1,2kHz 2 Vp-p. Nota : (Dependiendo en los osciladores, algunos de ellos producen CC cuando son encendidos. Por lo tanto, es conveniente conectar el oscilador después del encendido.) ● Ajuste con el volumen de FCS. GAN (Ganancia de enfoque) de VR3 de modo que la figura de Lissajous del osciloscopio a ser un círculo horizontal (90° de diferencia de fase).

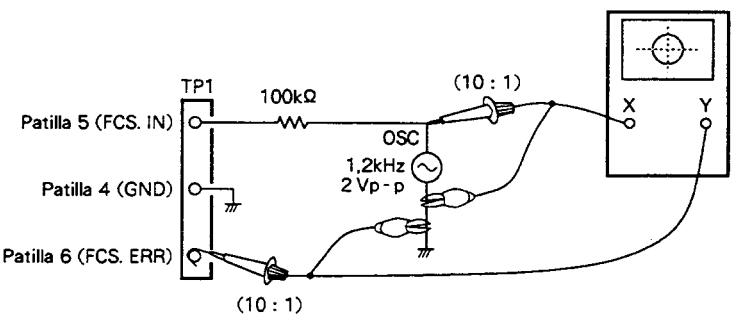


Fig. 7-6

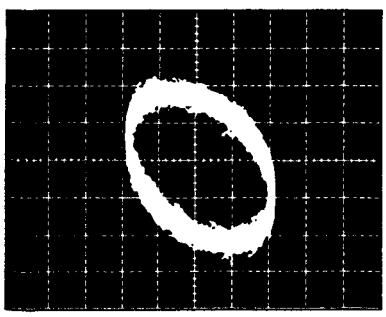


Foto. 7-10 Alta ganancia

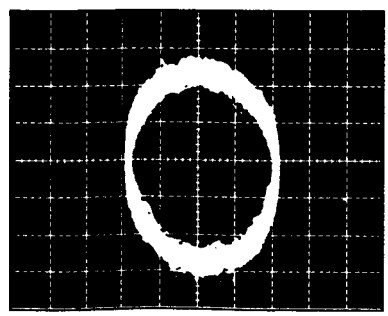


Foto. 7-11 Ganancia óptima

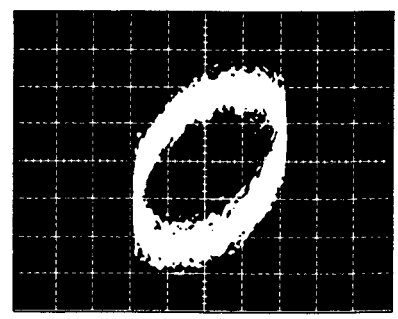


Foto. 7-12 Baja ganancia

No. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
9	**AJUSTE DE GANANCIA DE SEGUIMIENTO**					
	50mV/div, 5mV/div CH1 (X), CH2 (Y) (SONDA 10 : 1)		Eje X : Patilla 3 de TP1 (TRK. IN) Eje Y : Patilla 2 de TP1 (TRK. ERR)	VR4 (TRK. GAN)	90° de diferencia	● En el estado de POWER OFF (apagado), conecte un osciloscopio y un oscilador como se muestra en la Fig. 7-7. ● Ponga la unidad en el modo de reproducción (PLAY) normal. ● Encienda el oscilador y extraiga 1,2 kHz 2 Vp-p. Nota : (Dependiendo en los osciladores, algunos de ellos producen CC cuando son encendidos. Por la tanto, es conveniente conectar el oscilador después del encendido.) ● Ajuste con el volumen de TRK. GAN de VR4 (Ganacia de seguimiento) de modo que la figura de Lissajous del osciloscopio llege a ser un círculo horizontal (90° de diferencia de fase).

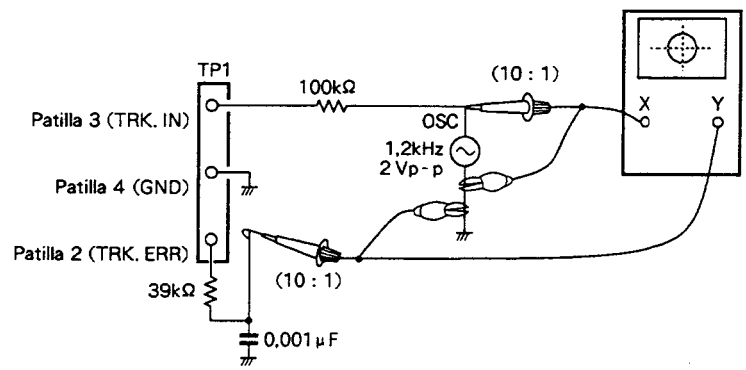


Fig. 7-7

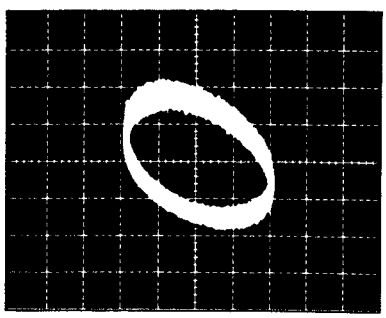


Foto. 7-13 Alta ganancia

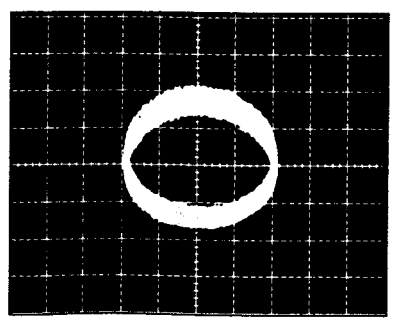


Foto. 7-14 Ganancia óptima

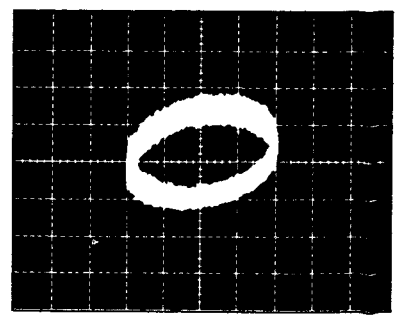


Foto. 7-15 Baja ganancia

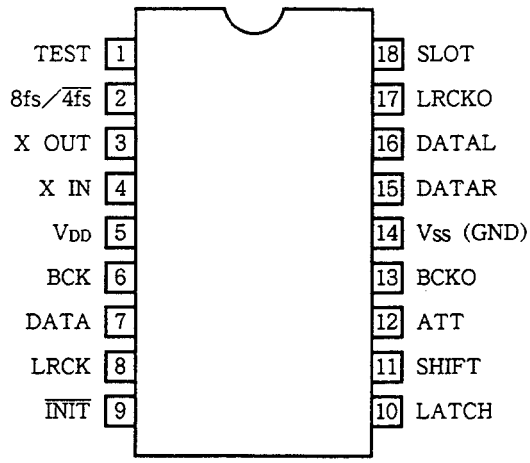
No. de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
10	**AJUSTE DE LA FRECUENCIA PROPIA DE VCO**					
			Patilla 2 de TP2 (PLCK)	VR8 (VCO. ADJ)	4,275 ± 0,025MHz	● Ajuste el modo de TEST. (Vea la página 49.) ● Haga un cortocircuito entre ASY y la conexión volante de GND con ⊖ destornillador, etc. (Fig. 7-1) ● Conecte el frecuencímentro, que pueda medir arriba de 10 MHz, a la patilla 2 de TP2 (PLCK). ● Ajuste con el volumen VCO ADJ (ajuste de VCO) de VR8 de modo que el valor del frecuencímetro se ponga en 4,275 ± 0,025 MHz.
11	**METODO PARA CONFIRMAR EL CARACTER S (ERROR DE ENFOQUE)**					
			Patilla 6 de TP1 (FCS. ERR)			● Ajuste el modo de TEST. (Vea la página 49.) ● Haga un cortocircuito entre FCS. IN (Entrada de enfoque) de la patilla 5 de TP1 y GND. ● Presione la tecla de TRACK FWD (▷▷|) y observe la forma de onda de FCS. ERR (Error de enfoque) de la patilla 6 de TP1 con un osciloscopio.

8. IC INFORMATION

■CXD2550P

Digital filter

●Pin connections (Top view)



●Pin functions

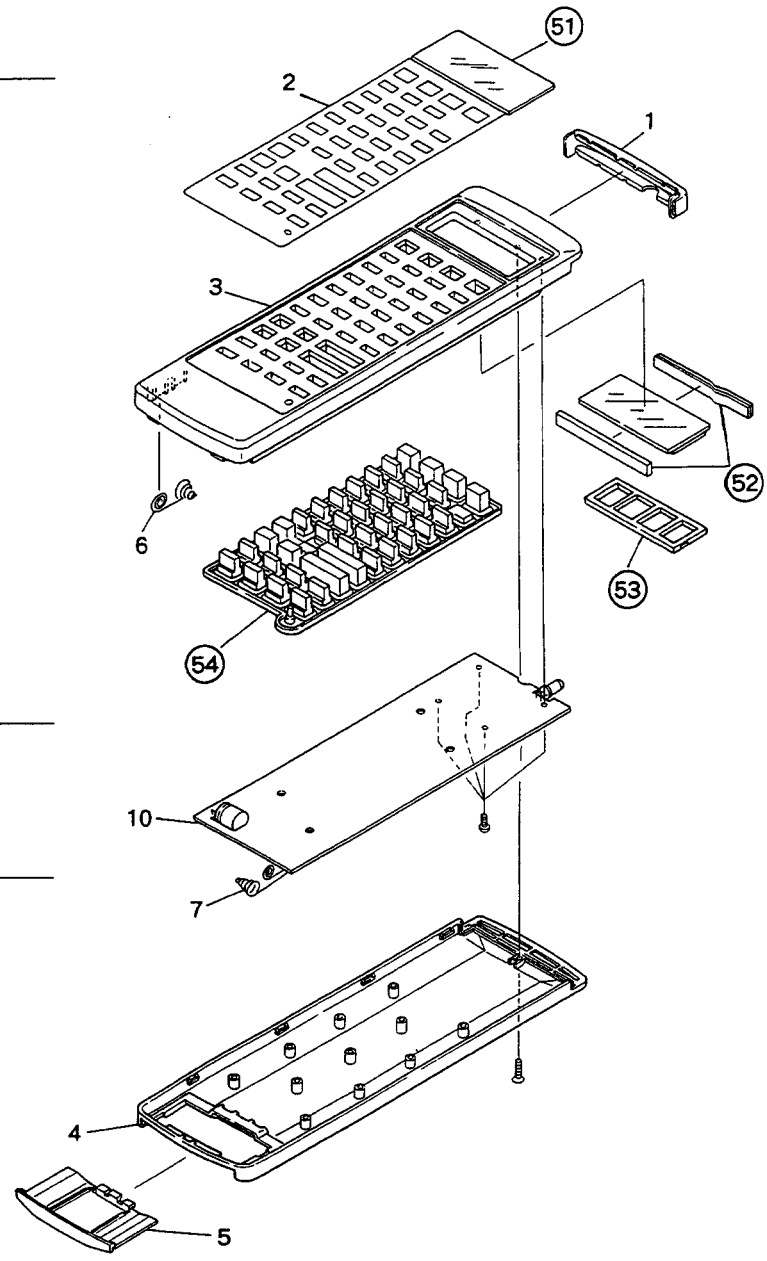
Pin	Pin name	I/O	Function
1	TEST	I	Terminal for TEST (Active : L)
2	8fs/4fs	I	Designation of FIR3 H ; 8fs, L ; 4fs
3	X OUT	O	Crystal OSC circuit output (f = 384fs)
4	X IN	I	Crystal OSC circuit input (f = 384fs)
5	VDD	–	+5V power supply
6	BCK	I	Bit clock input
7	DATA	I	Serial data input (2's complement)
8	LRCK	I	LR clock input
9	INIT	I	Synchronization is made again at the leading edge of the main signal.
10	LATCH	I	Signal input of latch clock
11	SHIFT	I	signal input of shift clock
12	ATT	I	Data input of attenuator
13	BCKO	O	BCK output
14	VSS (GND)	–	Ground terminal
15	DATAR	O	At 4fs : Word clock At 8fs : R ch serial data output (2's complement)
16	DATAL	O	At 4fs : Divided serial data output at L ch and R ch.(2's complement) At 8fs : Lch serial data output (2's complement)
17	LRCKO	O	LR select clock output
18	SLOT	I	Designation of output slot H : 18 bit slot, L : 16 bit slot

9. REMOTE CONTROL UNIT (FOR PD-M610 TYPE)

NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

9.1 PARTS LIST OF REMOTE CONTROL UNIT

Mark	No.	Part No.	Description
	1	PZA1003	Filter
	2	PZA1001	Name plate
	3	PZN1002	Case A
	4	PZN1003	Case B
	5	PZN1004	Battery cover
	6	PZK1001	Terminal A (battery)
	7	PZK1002	Terminal B (battery)
	8	PZA1004	Panel
	9	PZB1003	Battery spring
	10	PZW1001	Remote control board assembly
	51		Window
	52		Connector
	53		Frame
	54		Rubber switch



9.2 ELECTRICAL PARTS LIST

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1	PD5115
	D1	SE303AC-Y

OTHERS

Mark	Symbol & Description	Part No.
	X1 Crystal resonator	DT-38
	X2 Ceramic resonator	CSB-480EB20

9.3 SCHEMATIC DIAGRAM

1. RESISTORS :
Indicated in Ω, 1/4W, 1/6W and 1/8W, ± 5% tolerance unless otherwise noted k ; kΩ, M ; MΩ, (F) ; ± 1%, (G) ; ± 2%, (K) ; ± 10%, (M) ; ± 20% tolerance.

2. CAPACITORS :
Indicated in capacity (μF) / voltage (V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

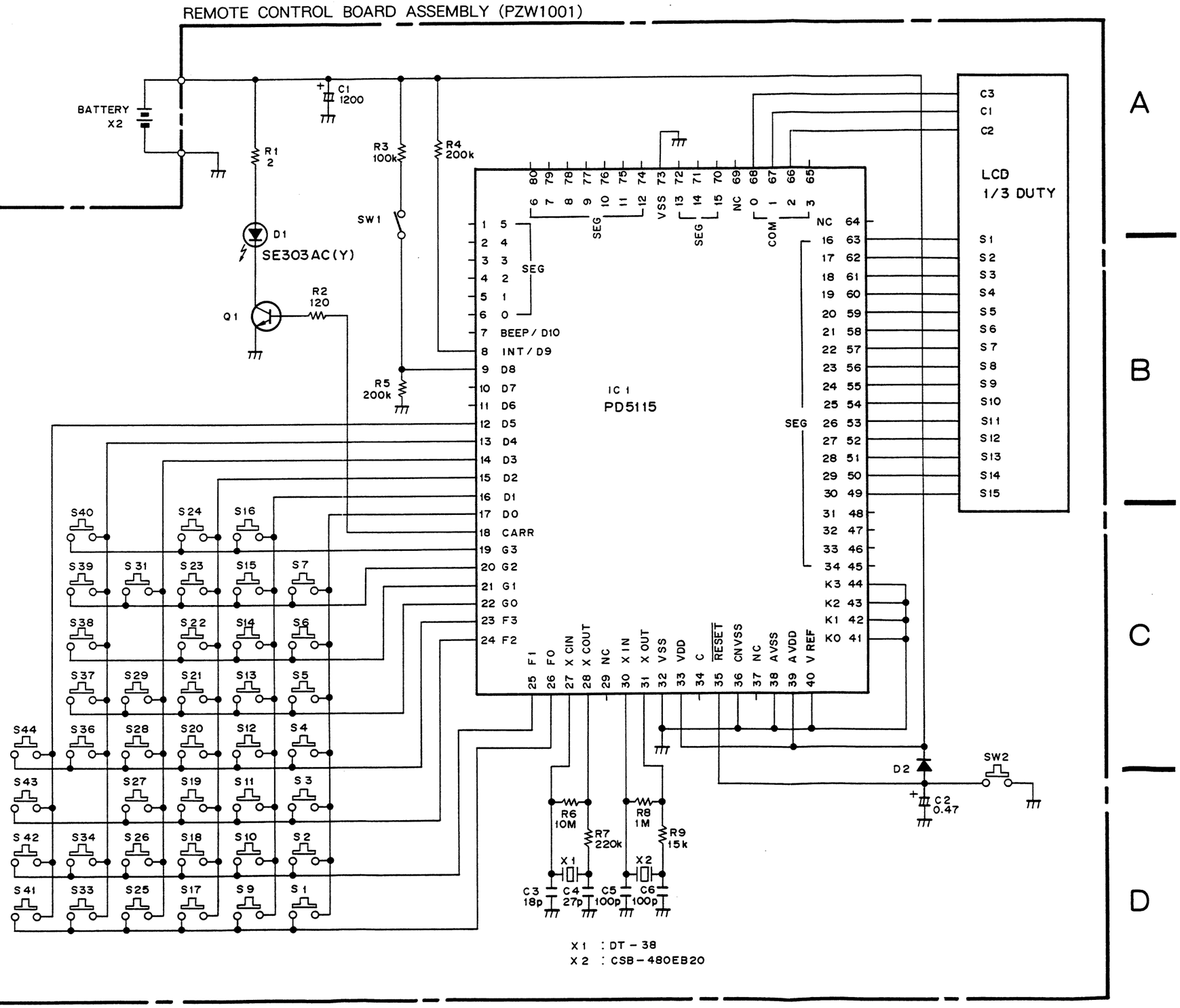
3 OTHERS :
➡ ; Signal route.
⊘ ; Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

4. SWITCHES : (The underlined indicates the switch position)
SW1 : REMOTE POWER ON/OFF
(When the battery cover is removed.)
SW2 : RESET

S1 : A ┐
S2 : B PROGRAM
S3 : C ┘
S4 : D
S5 : 1 ┐
S6 : 2
S7 : 3 DISC NUMBER
S9 : 4
S10 : 5
S11 : 6 ┘
S12 : TRANS
S13 : 1 ┐
S14 : 2 TRACK NUMBER
S15 : 3 ┘
S16 : + 10
S17 : 4 ┐
S18 : 5 TRACK NUMBER
S19 : 6 ┘
S20 : ≧ 20

S21 : 7 ┐
S22 : 8 TRACK NUMBER
S23 : 9 ┘
S24 : 10
S25 : PGM
S26 : CHECK
S27 : CLEAR
S28 : DELETE
S29 : EJECT ⏏
S31 : RANDOM PLAY
S33 : STOP ■
S34 : PAUSE ❚❚
S36 : PLAY ▶
S37 : ◀◀ ┐ MANUAL
S38 : ▶▶ ┘
S39 : ⏮ ┐ TRACK
S40 : ⏭ ┘
S41 : IN ┐ FADE
S42 : OUT ┘
S43 : − ┐ LEVEL
S44 : + ┘



9.4 IC INFORMATION

■ PD5115

Microcomputer for remote control

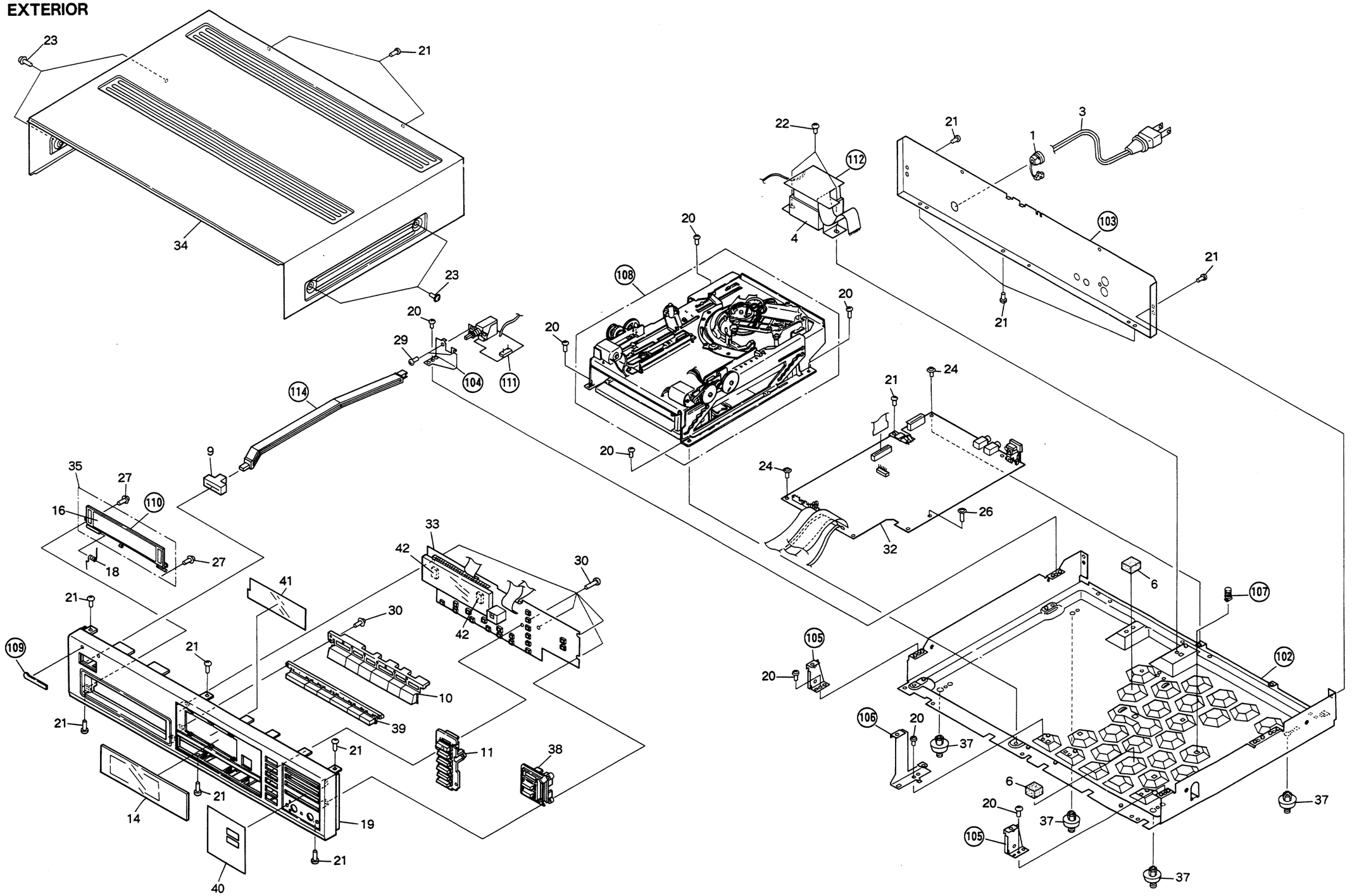
● Pin function

Pin No.	Pin name	I/O	Function and Operation
1 | 7	N. C		
8	INT/D9	I/O	I/O port D Inputs and outputs data in 1-bit unit. Input is possible when the output latch is programmed for "1". Output circuit is of N-channel open drain type.
9	D8		
10 | 11	N. C		
12	D5	I/O	I/O port D Inputs and outputs data in 1-bit unit. Input is possible when the output latch is programmed for "1". Output circuit is of N-channel open drain type.
13	D4		
14	D3		
15	D2		
16	D1		
17	D0		
18	CARR	O	Carrier output terminal for the remote control.
19	G3	I/O	I/O port G Inputs and outputs data in 4-bit unit.
20	G2		
21	G1		
22	G0		
23	F3	I/O	I/O port F Inputs and outputs data in 4-bit unit. Input is possible when the output latch is programmed for "1".
24	F2		
25	F1		
26	F0		
27	X CIN	I	I/O terminals of f (X CIN) clock circuit. Connect the crystal (32.768kHz) between 27 and 28 terminals.
28	X COUT	O	
29	N,C		
30	X IN	I	I/O terminals of f (X IN) clock circuit.
31	X OUT	O	
32	Vss		Ground
33	V_{DD}		Power supply
34	N.C		
35	$\overline{RESET}$	I	Input termanal of reset signal. If the "L" level is applied for more than 1 machine cycle to this connector, the micro computer will be reset.
36	CNVss	I	Connect to Vss (GND). Active : L (ON)
37	N. C		

Pin No.	Pin name	I/O	Function and Operation
38	AVss		GND Power supply } A – D converter
39	AV_{DD}		
40	VREF	I	Input terminal of reference power supply voltage for the A – D converter.
41	K0	I	Connect to GND.
42	K1		
43	K2		
44	K3		
45 | 48	N. C		
49	SEG30	O	Segment output terminals for the LCD.
50	SEG29		
51	SEG28		
52	SEG27		
53	SEG26		
54	SEG25		
55	SEG24		
56	SEG23		
57	SEG22		
58	SEG21		
59	SEG20		
60	SEG19		
61	SEG18		
62	SEG17		
63	SEG16		
64	N. C		
65	N. C		
66	COM2	O	Common output terminals for the LCD.
67	COM1		
68	COM0		
69	N. C		
70 | 72	N. C		
73	Vss		Ground
74 | 80	N. C		

10. EXPLODED VIEWS AND PARTS LIST (FOR PD−M510/KU TYPE)

10.1 EXTERIOR



- The multi mechanism assembly of PD－M510/KU is identical with that of PD－M610/KU described in Mechanism Section of "EXPLODED VIEWS AND PARTS LIST". (See pages from 7 to 9.)
- The adjustment procedure for PD－M510/KU is the same as that of PD－M610/KU. (Refer to "ADJUSTMENTS" on pages from 29 to 58.)
- "PACKING" for PD－M510/KU is described on the same page of "PACKING" of PD－M610/KU.

NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List

Mark	No.	Part No.	Description
⚠	1	CM-22C	Strain relief
	2		• • • • •
⚠	3	PDG1002	AC power cord
⚠	4	PTT1103	Power transformer (AC120V)
	5		• • • • •
	6	PNM1059	Cushion
	7		• • • • •
	8		• • • • •
	9	PAC1246	Power button A
	10	PAC1390	Function button
	11	PAC1389	Disc button
	12		• • • • •
	13		• • • • •
	14	PAM1301	Window
	15		• • • • •
	16	PAM1293	Door name plate
	17		• • • • •
	18	PBH1022	Door spring
	19	PNW1534	Front panel
	20	BBZ30P060FMC	Screw
	21	BBZ30P080FZK	Screw
	22	BBZ40P060FMC	Screw
	23	FBT40P080FZK	Screw
	24	IBZ30P060FCC	Screw
	25		• • • • •
	26	IBZ30P150FCU	Screw
	27	IPZ30P060FMC	Screw
	28		• • • • •
	29	PMZ30P060FMC	Screw
	30	PPZ30P120FMC	Screw
	31		• • • • •
◉	32	PWZ1603	Main board assembly
◉	33	PWZ1612	Function board assembly
	34	PYY1062	Bonnet
	35	PYY1107	Door assembly
	36		• • • • •
	37	REC-434	Leg assembly
	38	PAC1393	Program button
	39	PAC1394	Mode button
	40	PAM1299	Program name plate
	41	PAM1300	Screen
	42	PEB1022	FL spacer
	101		• • • • •
	102		Base
	103		Rear panel
	104		SW angle
	105		Angle
	106		Center angle
	107		P.C.B spacer
	108		Multi mechanism assembly
	109		Name plate
	110		Door
	111		Power switch board assembly
	112		Transformer board assembly
	113		• • • • •
	114		Joint (POWER)

11. SCHEMATIC DIAGRAM (FOR PD－M510/KU TYPE)

1. RESISTORS :
Indicated in Ω, 1/4W, 1/6W and 1/8W, ±5% tolerance unless otherwise noted k ; kΩ, M ; MΩ, (F) ; ±1%, (G) ; ±2%, (K) ; ±10%, (M) ; ±20% tolerance.

2. CAPACITORS :
Indicated in capacity (μF) / voltage (V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT :
▭ ; DC voltage (V) at play state.
⇦mA ; DC current at play state.
Value in ( ) is DC current at stop state.

4. OTHERS :
➡ ; Signal route.
⊘ ; Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES : (The underlined indicates the switch position)
OUTSIDE OF P.C.BOARD ASSEMBLY
S101 : INSIDE ON — OFF
MAIN BOARD ASSEMBLY
S1 : TEST MODE ON — OFF
FUNCTION BOARD ASSEMBLY
S201 : EJECT
S202 : 1 ┐
S203 : 2 │
S204 : 3 │ (DISC NO.)
S205 : 4 │
S206 : 5 │
S207 : 6 ┘
S216 : TIME
S217 : PROGRAM
S218 : CLEAR
S222 : REPEAT
S223 : MANUAL SEARCH (◀◀)
S224 : MANUAL SEARCH (▶▶)
S225 : PLAY
S226 : RANDOM PLAY
S227 : TRACK SEARCH (|◀◀)
S228 : TRACK SEARCH (▶▶|)
S229 : PAUSE
S230 : STOP

SWITCH BOARD ASSEMBLY
S801 : LPS1 LOADING POSITION
S802 : LPS2

	STOP	DURING THE LOADING	CLAMP CONDITION PLAY	DURING THE EJECT
S801	ON (H)	OFF (L)	OFF (L)	ON (H)
S802	ON (H)	ON (H)	OFF (L)	OFF (L)

S803 : MZS2 MAGAZINE
S804 : MZS1

	NO MAGAZINE	SIX MAGAZINES	SINGLE
S803	ON (H)	OFF (L)	OFF (L)
S804	OFF (L)	ON (H)	OFF (L)

POWER SWITCH BOARD ASSEMBLY
S401 : POWER ON－OFF

1 2 3 4 5 6

A B C D

PICK UP ASSEMBLY PWY1008

MAIN BOARD ASSEMBLY PWZ1602 (PD-M410 TYPE) PWZ1603 (PD-M510 TYPE)

CN11

VR1: LD POWER ADJ

VR2: RF OFFSET

VR7: TRACKING OFFSET

VR5: TRACKING BALANCE

VR4: TRACKING GAIN

VR3: FOCUS GAIN

VR6: FOCUS OFFSET

VR8: VCO

IC1: RF AMP

Q1: LD POWER

IC3: DECODER

IC 3

IC 6 SYSTEM CONTROL

Q19: INVERTER

Q8,9: PLL FILTER

Q5-7: RESET

IC16 (1/2): DISC SELECT DRIVE

IC16 (2/2): LOADING DRIVE

IC17 (1/2): SPINDLE DRIVE

IC17 (2/2): CARRIAGE DRIVE

IC18 (1/2): FOCUS DRIVE

IC18 (2/2): TRACKING DRIVE

SERVO MECHANISM ASSEMBLY (1/2)

SPINDLE MOTOR PYY1109

SWITCH BOARD ASSEMBLY

S701-S704: PSH1004

SELECT BOARD ASSEMBLY

Q601 GP1A52HR

S601 MODE PSH1005

LOADING MOTOR PYY1025

DISC SELECT MOTOR PYY1025

SERVO MECHANISM ASSEMBLY (2/2)

S101 INSIDE SW PSH1003

CARRIAGE MOTOR INDICATES FWD) RYY1025

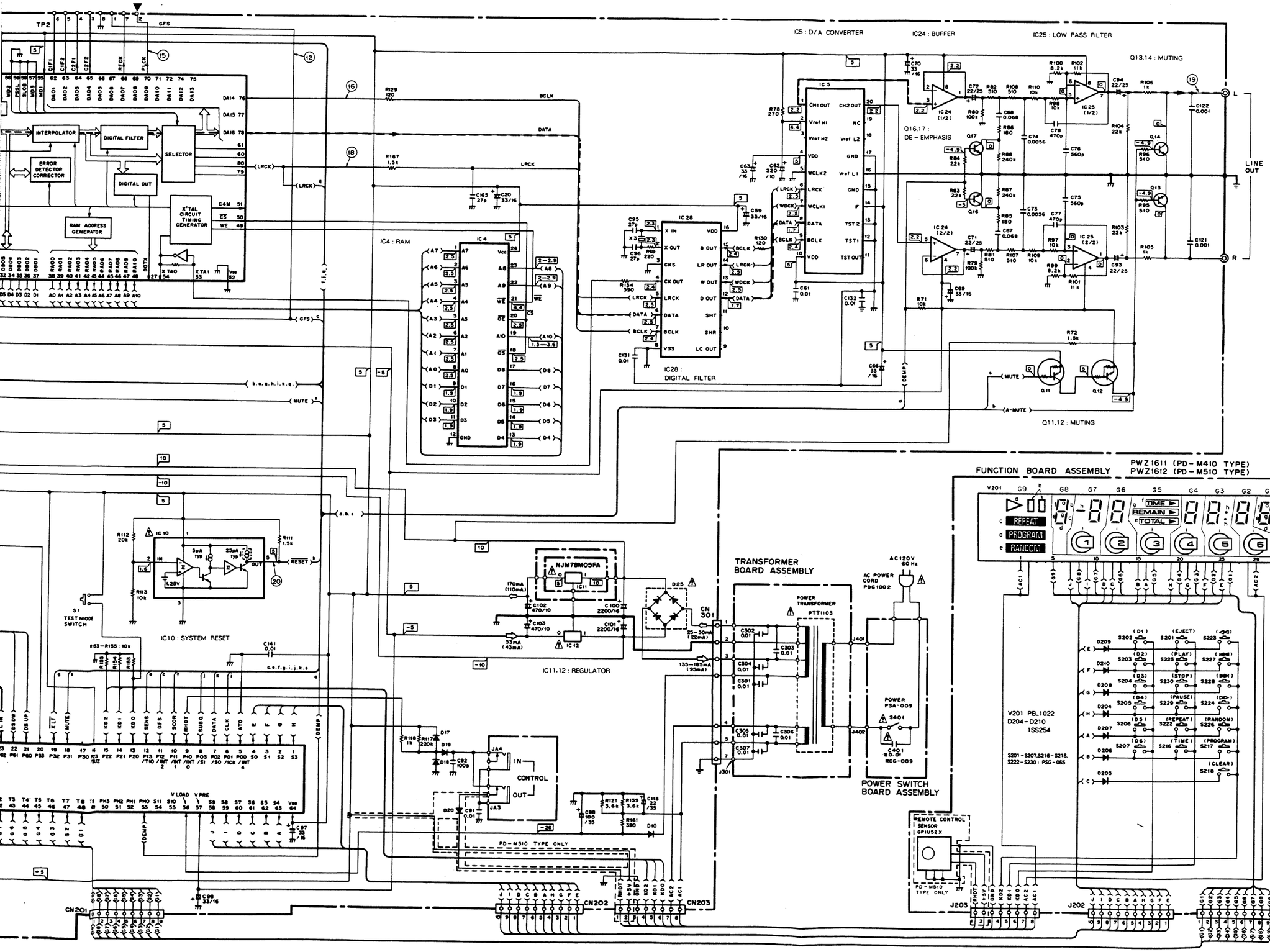
DIRECTION | CN4
FORWARD | + | -
REVERSE | - | +

S1 TEST MODE SWITCH

CN201

R149-R152: 10k

R153-R155: 10k



▶ : Measurement point

SIGNAL ROUTE :

- : Focus servo loop
- : Signal route
- : Tracking servo loop
- : Carriage servo loop
- : Disc select motor route
- : Loading motor route
- : Spindle motor route

MAIN BOARD ASSEMBLY

IC1	CXA1081S
IC2	CXA1082BS
IC3	CXD1130Q2
IC4	LH5116-15
IC5	LC7881-C
IC10	M51955AL
IC24,IC25	NJM4558D-D
IC11	NJM78M05FA
IC12	NJM79M05FA
IC28	PD0034
IC6	PD4150
IC16-IC18	TA8410K
Q6,Q11	DTA124ES
Q12,Q19	DTC124ES
Q1	2SA1399
Q7	2SA933S
Q5,Q8,Q9,Q16,Q17	2SC1740S
Q13,Q14	2SD1302
D10	1SR139-100
D17-D19	1SS254
D20	1SS254 (PD-M510 ONLY)
D25	WL02ML-5004
S1	PSG-064
VR2	VRT86VS103
VR3-VR7	VRT86VS223
VR8	VRT56VS102
X1	VSS1004
X3	PSS-012

IC2
(CXA1082BS)

Pin No.	Voltage	Pin No.	Voltage
1	– 5	25	– 5
2	0	26	0
3	0	27	5
4	0	28	5
5	0	29	5
6	0	30	5
7	0	31	5
8	0	32	0
9	0	33	2.5
10	0	34	2.5
11	0	35	2.3
12	0	36	2.3
13	0.2	37	3.5
14	0	38	2.4
15	0	39	5
16	5	40	2.5
17	0	41	5
18	0	42	2.5
19	0	43	5
20	0	44	0
21	0	45	0.2 – 0.6
22	0	46	2.5
23	– 4.1	47	5
24	5	48	0

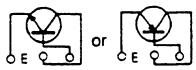
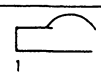
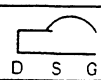
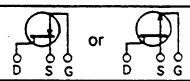
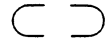
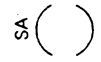
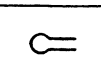
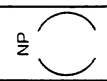
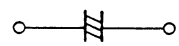
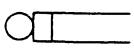
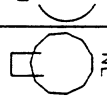
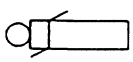
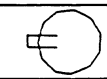
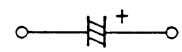
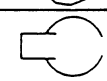
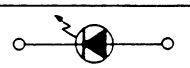
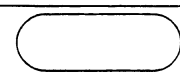
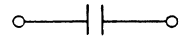
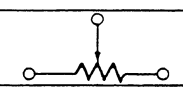
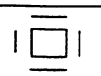
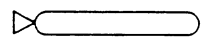
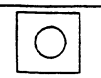
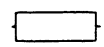
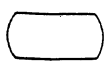
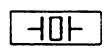
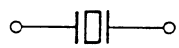
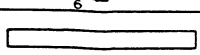
IC3
(CXD1130QZ)

Pin No.	Voltage	Pin No.	Voltage
1	2.5	41	2.5
2	5	42	2.5
3	2.5	43	2.5
4	2.8	44	2.5
5	2.4	45	2.5
6	2.5	46	2.0 – 2.9
7	5	47	2.0 – 2.9
8	2.4	48	1.3 – 3.6
9	2.4	49	4.4
10	0	50	2.5
11	1.8	51	2.3
12	0	52	0
13	5	53	2.2
14	5	54	2.2
15	5	55	5
16	5	56	0
17	0	57	0
18	5	58	0
19	0	59	0
20	5	60	1.3
21	0	61	1.3
22	0	62	0
23	0	63	0
24	0	64	0
25	5	65	0
26	5	66	0
27	2.5	67	0
28	5	68	2.5
29	1.9	69	2.5
30	1.9	70	2.3
31	1.9	71	5
32	1.9	72	0
33	5	73	5
34	1.9	74	0
35	1.9	75	2.4
36	1.9	76	2.3
37	1.9	77	2.3
38	2.5	78	2.5
39	2.5	79	2.5
40	2.5	80	2.5

IC6
(PD4150A)

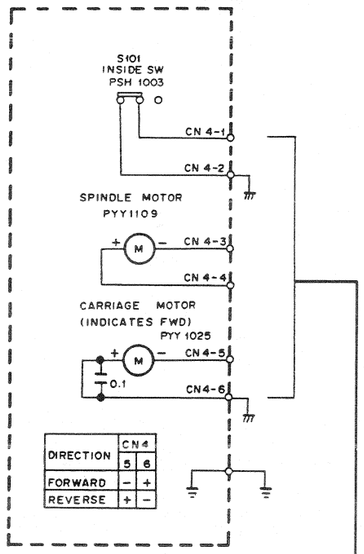
Pin No.	Voltage	Pin No.	Voltage
1	– 13.2	33	0
2	-16.2 – -22.1	34	5
3	-10 – -13	35	0
4	-12.3 – -15.4	36	0
5	0	37	0
6	5	38	5
7	5	39	5
8	0.2 – 3.5	40	– 22.4
9	4.9	41	– 22.4
10	0.1	42	– 22.5
11	5	43	– 22.5
12	5	44	– 22.6
13	0	45	– 22.6
14	0	46	– 22.5
15	0	47	– 22.6
16	5	48	– 22.6
17	5	49	– 25.5
18	0	50	5
19	5	51	0.1
20	5	52	5
21	0	53	– 5
22	0	54	– 19.5
23	0	55	-6.9 – -7.3
24	0	56	– 25.9
25	5	57	– 5
26	5	58	– 22.4
27	5	59	-7.4 – -7.6
28	5	60	-12.5 – -15.4
29	0	61	-0.9 – -4
30	2.3	62	– 3.9
31	2.3	63	-9.3 – -12.4
32	0	64	5

12. P. C. BOARDS CONNECTION DIAGRAM (FOR PD-M510/KU TYPE)

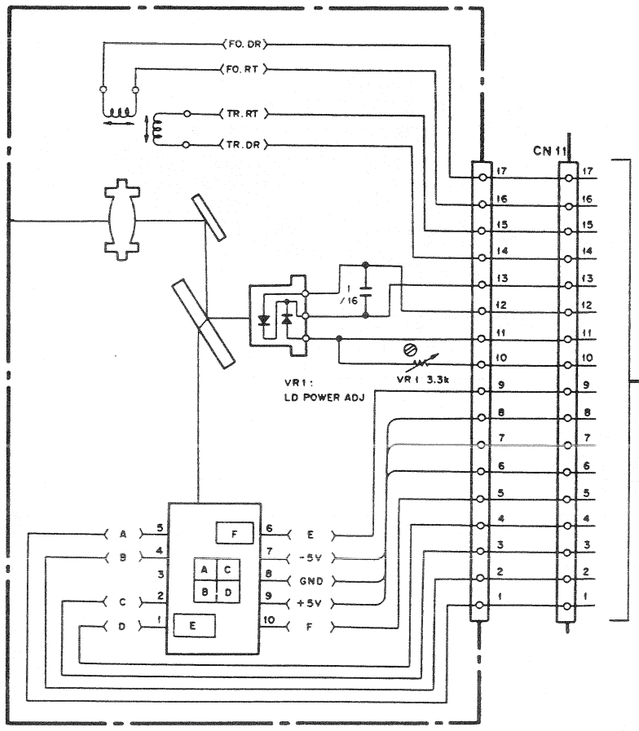
P.C.B. pattern diagram indication	Corresponding part symbol	Part name	P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor			Ceramic capacitor
					
		FET			Mylar capacitor
		Diode			Styrol capacitor
					Electrolytic capacitor (Non polarized)
					Electrolytic capacitor (Noiseless)
		Zenner diode			Electrolytic capacitor (Polarized)
					Electrolytic capacitor (Polarized)
		LED			Power capacitor
		Varactor			Semi-fixed resistor
		Tact switch			Resistor array
					Resistor
		Inductor			
					
		Coil			Resonator
		Transformer			Thermistor
		Filter			

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with O shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

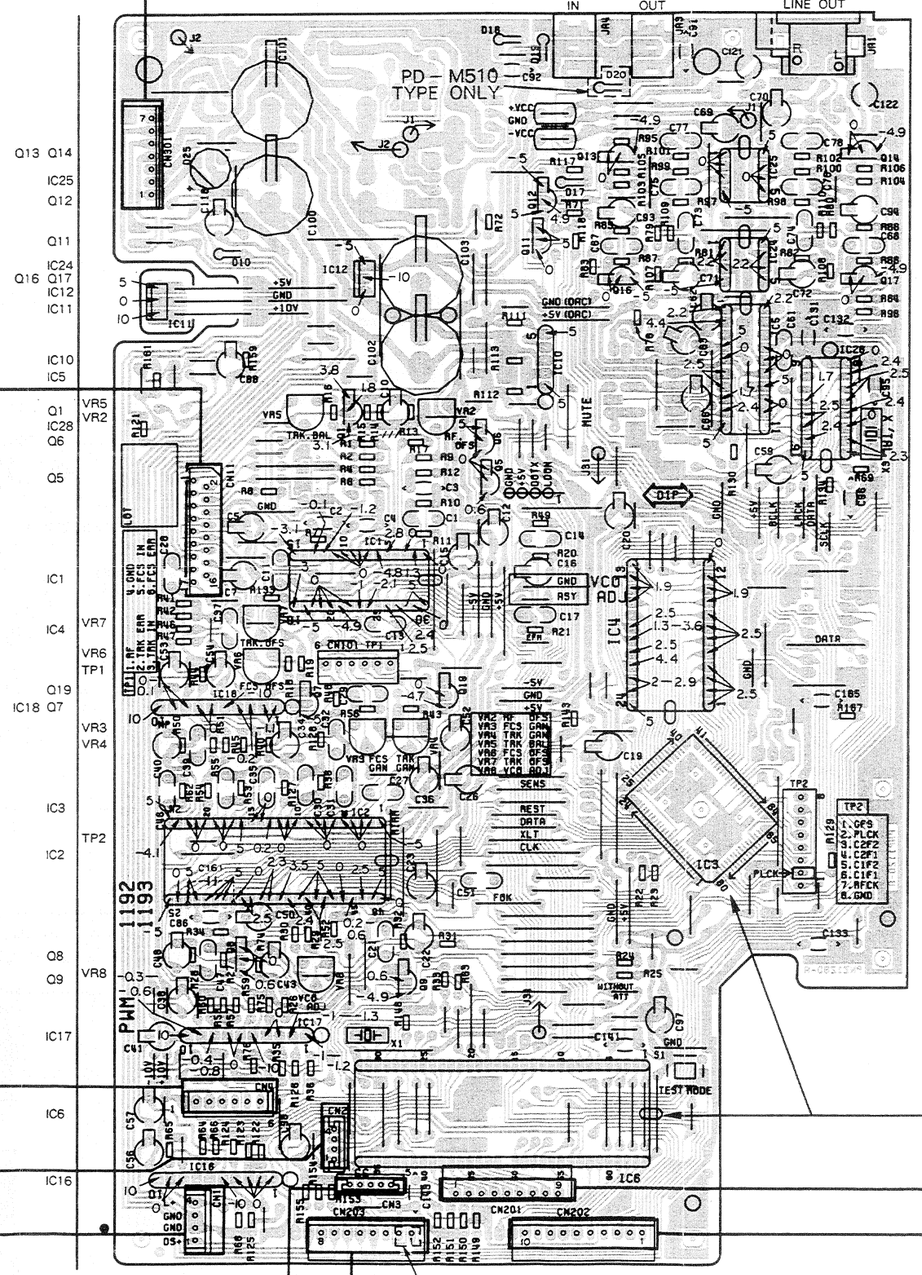
SERVO MECHANISM ASSEMBLY



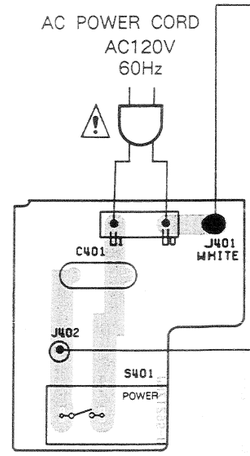
PICKUP ASSEMBLY (PWY1008)



MAIN BOARD ASSEMBLY (PWZ1602: PD-M410 TYPE)
(PWZ1603: PD-M510 TYPE)

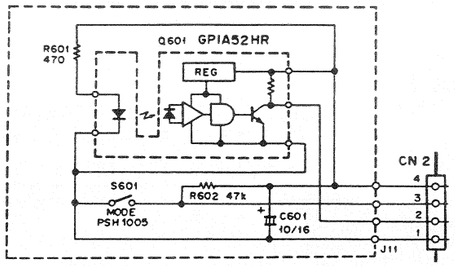


AC POWER CORD
AC120V
60Hz

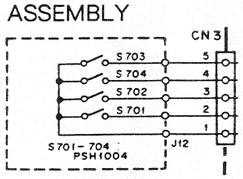


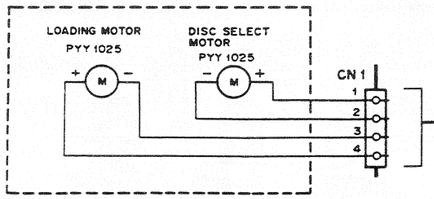
POWER SWITCH
BOARD ASSEMBLY

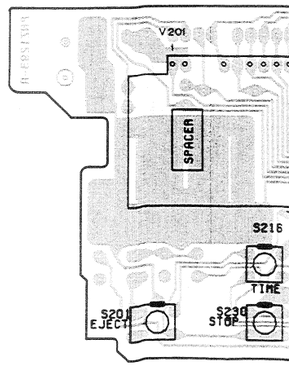
SELECT BOARD ASSEMBLY



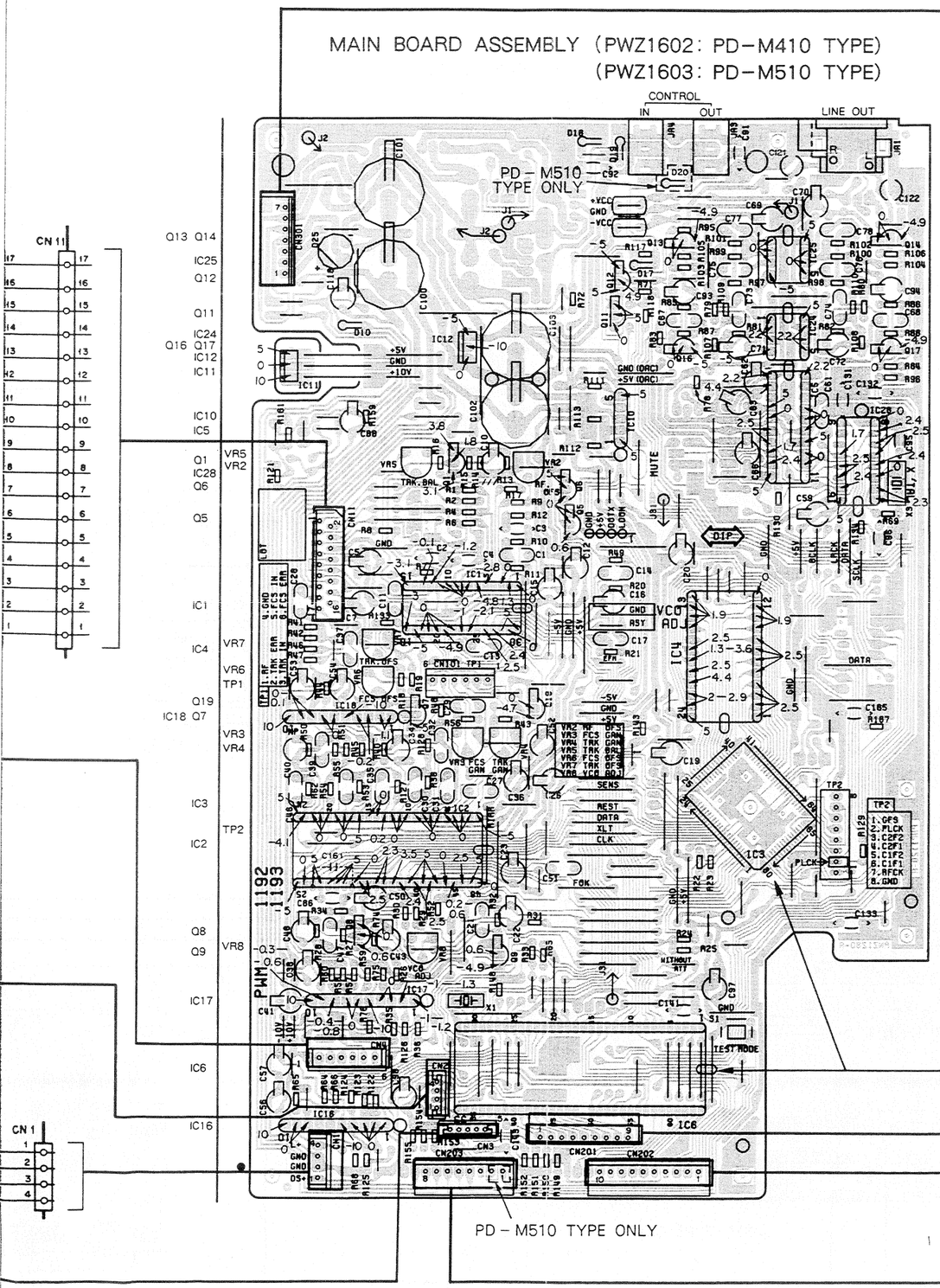
SWITCH BOARD ASSEMBLY

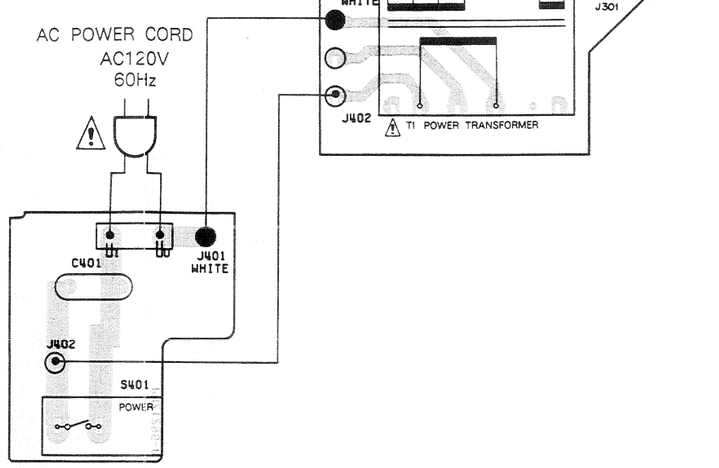




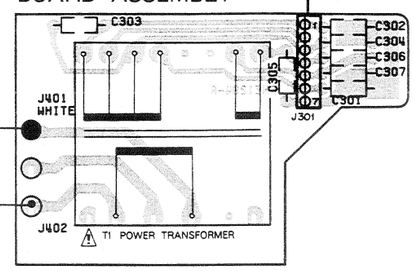


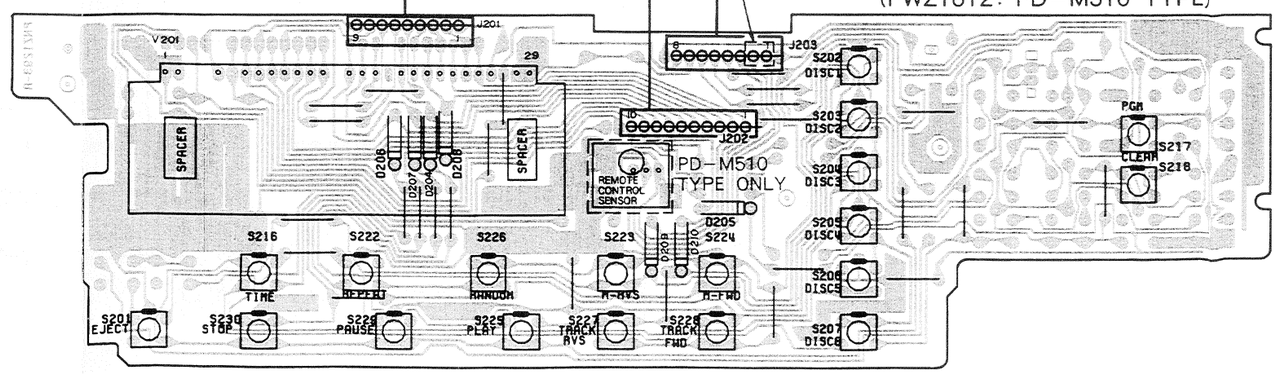
MAIN BOARD ASSEMBLY (PWZ1602: PD-M410 TYPE) (PWZ1603: PD-M510 TYPE)





POWER SWITCH BOARD ASSEMBLY



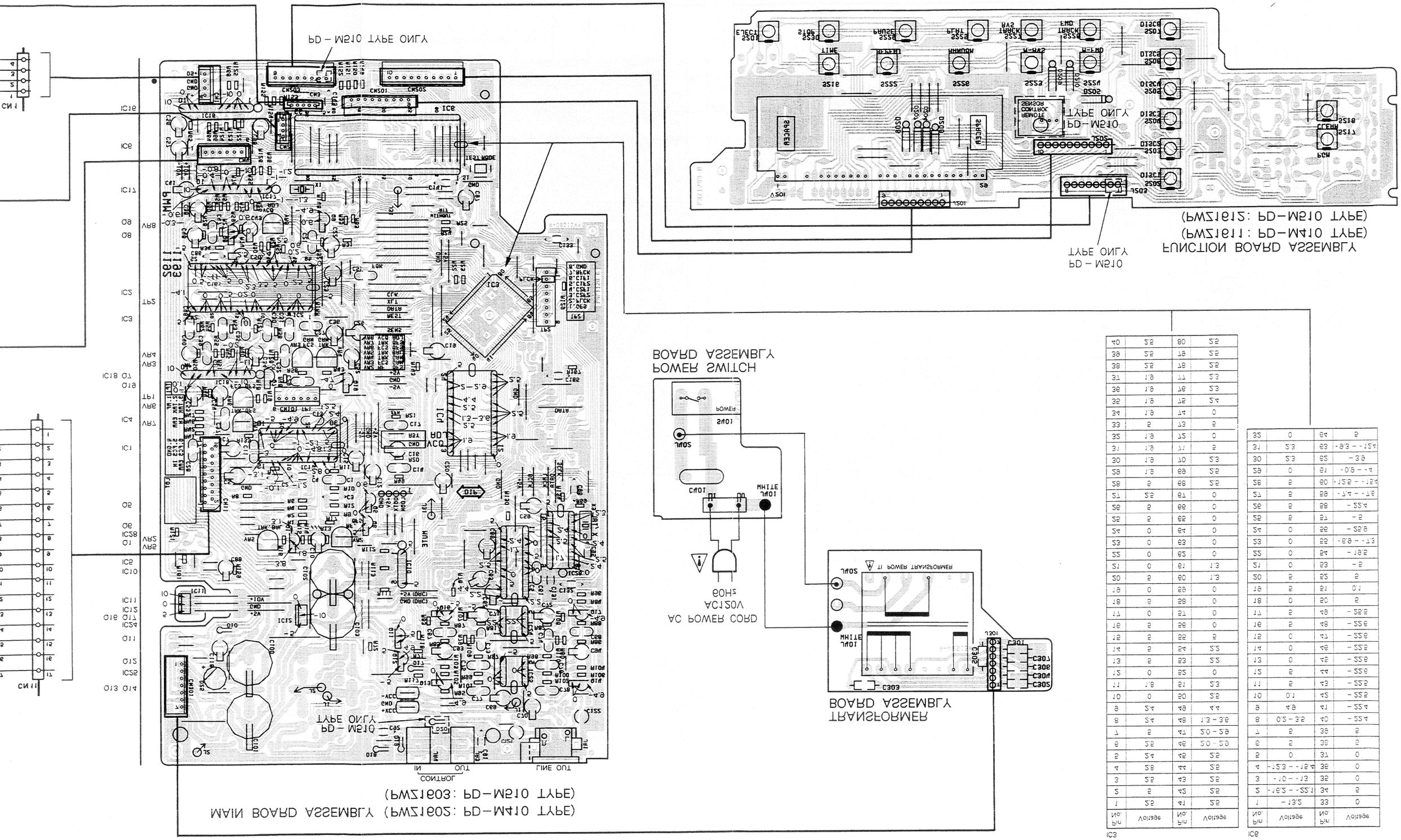


IC3

Pin No.	Voltage	Pin No.	Voltage
1	2.5	41	2.5
2	5	42	2.5
3	2.5	43	2.5
4	2.8	44	2.5
5	2.4	45	2.5
6	2.5	46	2.0 – 2.9
7	5	47	2.0 – 2.9
8	2.4	48	1.3 – 3.6
9	2.4	49	4.4
10	0	50	2.5
11	1.8	51	2.3
12	0	52	0
13	5	53	2.2
14	5	54	2.2
15	5	55	5
16	5	56	0
17	0	57	0
18	5	58	0
19	0	59	0
20	5	60	1.3
21	0	61	1.3
22	0	62	0
23	0	63	0
24	0	64	0
25	5	65	0
26	5	66	0
27	2.5	67	0
28	5	68	2.5
29	1.9	69	2.5
30	1.9	70	2.3
31	1.9	71	5
32	1.9	72	0
33	5	73	5
34	1.9	74	0
35	1.9	75	2.4
36	1.9	76	2.3
37	1.9	77	2.3
38	2.5	78	2.5
39	2.5	79	2.5
40	2.5	80	2.5

IC6

Pin No.	Voltage	Pin No.	Voltage
1	– 13.2	33	0
2	-16.2 – -22.1	34	5
3	-10 – -13	35	0
4	-12.3 – -15.4	36	0
5	0	37	0
6	5	38	5
7	5	39	5
8	0.2 – 3.5	40	– 22.4
9	4.9	41	– 22.4
10	0.1	42	– 22.5
11	5	43	– 22.5
12	5	44	– 22.6
13	0	45	– 22.6
14	0	46	– 22.5
15	0	47	– 22.6
16	5	48	– 22.6
17	5	49	– 25.6
18	0	50	5
19	5	51	0.1
20	5	52	5
21	0	53	– 5
22	0	54	– 19.5
23	0	55	-6.9 – -7.3
24	0	56	– 25.9
25	5	57	– 5
26	5	58	– 22.4
27	5	59	-7.4 – -7.6
28	5	60	-12.5 – -15.4
29	0	61	-0.9 – -1.4
30	2.3	62	– 3.9
31	2.3	63	-9.3 – -12.4
32	0	64	5

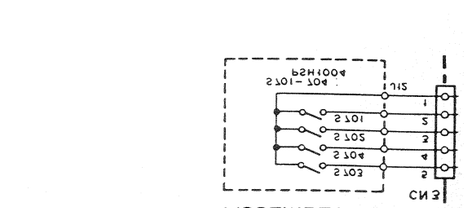


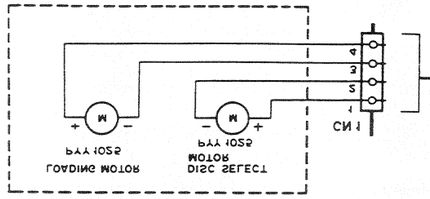
IC3

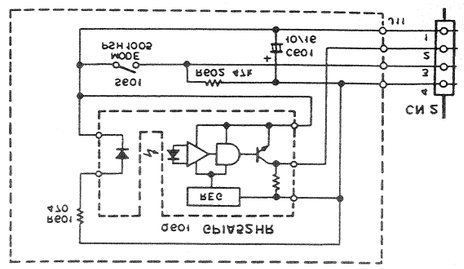
No.	Voltage	No.	Voltage
1	5.1V	41	5.1V
2	5.1V	42	5.1V
3	5.1V	43	5.1V
4	5.1V	44	5.1V
5	5.1V	45	5.1V
6	5.1V	46	5.1V
7	5.1V	47	0.0 - 0.5V
8	5.1V	48	0.0 - 5.1V
9	5.1V	49	0.0 - 0.5V
10	0	50	5.1V
11	5.1V	51	5.1V
12	5.1V	52	5.1V
13	5.1V	53	5.1V
14	0	54	0
15	5.1V	55	5.1V
16	5.1V	56	0
17	5.1V	57	5.1V
18	5.1V	58	5.1V
19	5.1V	59	5.1V
20	5.1V	60	5.1V
21	5.1V	61	5.1V
22	0	62	5.1V
23	0	63	0
24	0	64	0
25	0	65	0
26	0	66	0
27	0	67	0
28	0	68	0
29	0	69	0
30	0	70	0
31	0	71	0
32	0	72	0
33	0	73	0
34	0	74	0
35	0	75	0
36	0	76	0
37	0	77	0
38	0	78	0
39	0	79	0
40	0	80	0

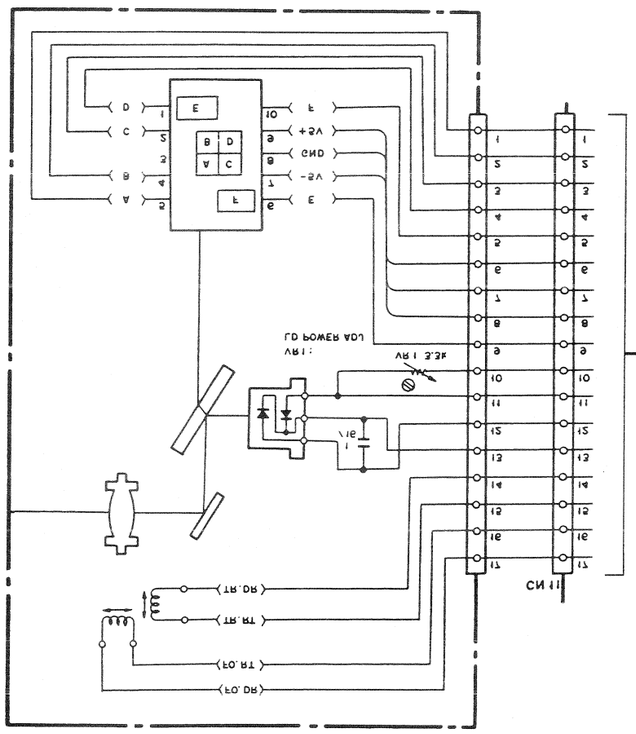
IC8

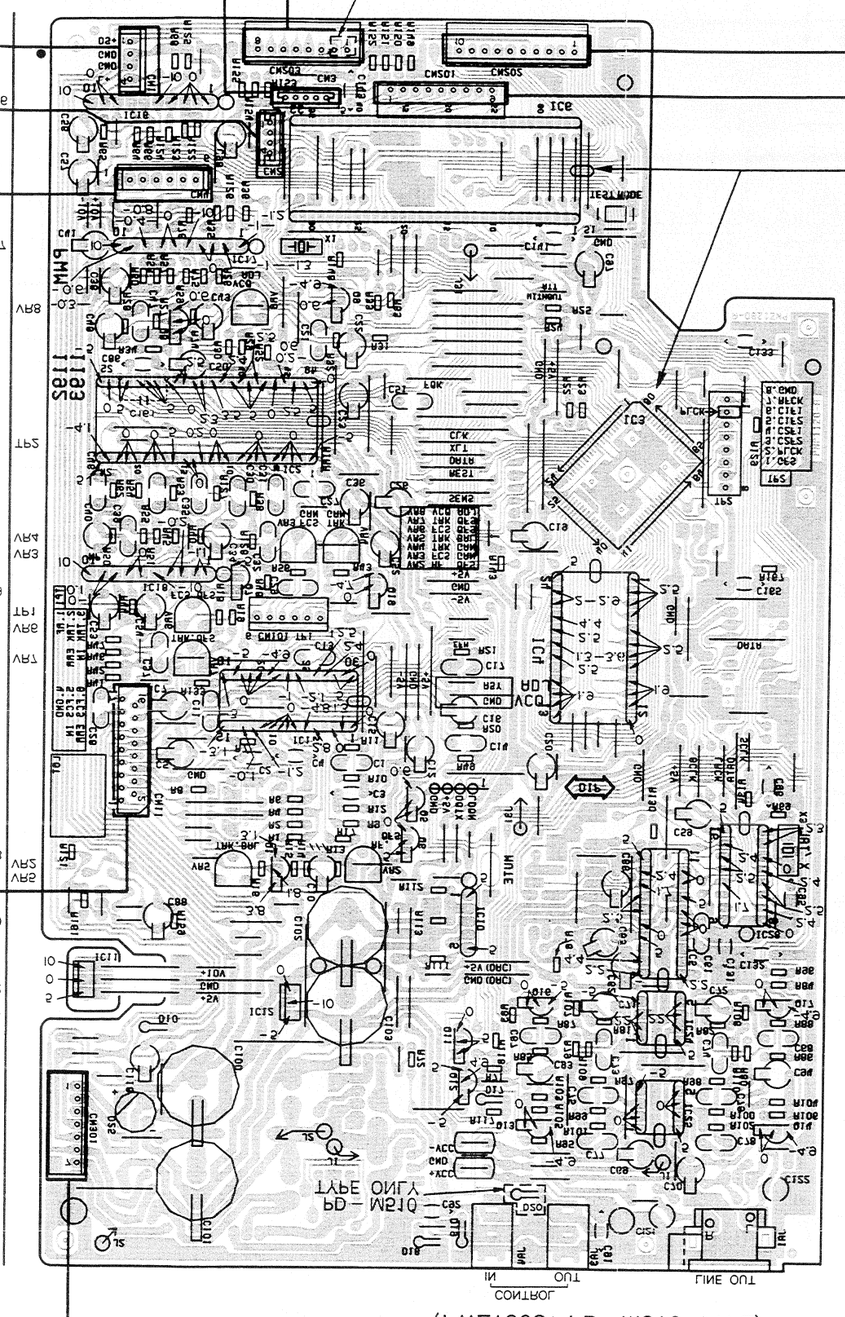
No.	Voltage	No.	Voltage
1	5.1V	33	0
2	0	34	5.1V - 5.3V
3	5.1V	35	0V - 0.7V
4	0	36	0 - 5.1V - 5.3V
5	5.1V - 5.3V	37	0
6	5.1V	38	0 - 5.1V
7	0	39	5.1V
8	5.1V - 5.3V	40	0 - 5.1V - 5.3V
9	5.1V	41	0 - 5.1V
10	0	42	5.1V
11	5.1V	43	0
12	5.1V	44	5.1V
13	0	45	5.1V
14	5.1V	46	5.1V
15	0	47	5.1V
16	5.1V	48	5.1V
17	5.1V	49	5.1V
18	5.1V	50	5.1V
19	5.1V	51	5.1V
20	5.1V	52	5.1V
21	5.1V	53	5.1V
22	5.1V	54	5.1V
23	5.1V	55	5.1V
24	5.1V	56	5.1V
25	5.1V	57	5.1V
26	5.1V	58	5.1V
27	5.1V	59	5.1V
28	5.1V	60	5.1V
29	5.1V	61	5.1V
30	5.1V	62	5.1V
31	5.1V	63	5.1V
32	5.1V	64	5.1V

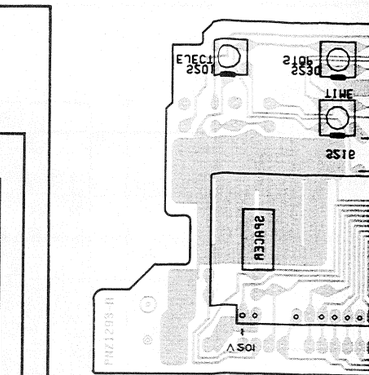


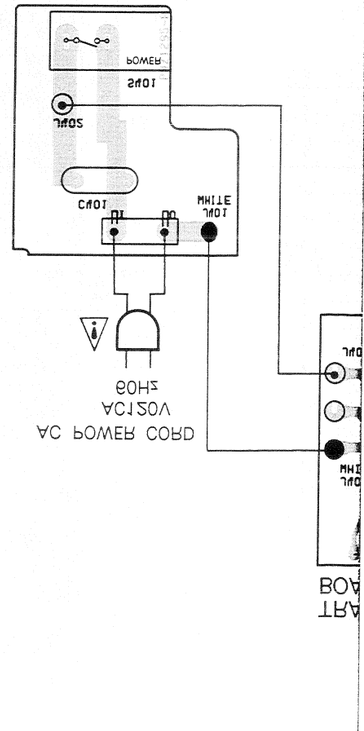












This P.C.B. connection diagram is viewed from the foil side.

13. ELECTRICAL PARTS LIST (FOR PD-M510/KU TYPE)

NOTES :
- Parts without part number cannot be supplied.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5 %, and K = 10 %).
560 Ω → 56 × 10^1 → 561 ····· RD1/4PS 5 6 1 J
47k Ω → 47 × 10^3 → 473 ····· RD1/4PS 4 7 3 J
0.5 Ω → 0R5 ····· RN2H 0 R 5 K
1 Ω → 010 ····· RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).
5.62k Ω → 562 × 10^1 → 5621 ····· RN1/4SR 5 6 2 1 F

Miscellaneous Parts

Mark	Symbol & Description	Part No.
	Power switch board assembly	
	Select board assembly	
◉	Function board assembly	PWZ1612
◉	Main board assembly	PWZ1603
	Transformer board assembly	
	Switch board assembly	
⚠	Strain relief	CM-22C
⚠	AC power cord	PDG1002
⚠	Power transformer	PTT1103
	Pickup assembly	PWY1008
	Spindle motor	PXM1001
	Motor assembly (LOADING,DISC SELECT, CARRIAGE)	PYY1025
	S101 Slide switch (INSIDE)	PSH1003
	Remote control unit	PWW1034

Power Switch Board Assembly

SWITCH

Mark	Symbol & Description	Part No.
⚠	S401 Push switch (POWER)	PSA-009

CAPACITOR

Mark	Symbol & Description	Part No.
⚠	C401 (0.01μF)	RCG-009

Select Board Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
	Q601	GP1A52HR

SWITCH

Mark	Symbol & Description	Part No.
	S601 Slide switch (MODE)	PSH1005

CAPACITOR

Mark	Symbol & Description	Part No.
	C601	CEAL100M16

RESISTORS

Mark	Symbol & Description	Part No.
	R601,R602	RD1/6PM □□□J

◉ Function Board Assembly (PWZ1612)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D204 – D210	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
	S201 – S207,S216 – S218, S222 – S230 Tact switch (EJECT, DISC (1 – 6), TIME, PGM, CLEAR, REPEAT, MANUAL SEARCH (◀◀, ▶▶), PLAY, RANDOM PLAY, TRACK SEARCH (⏮, ⏭), PAUSE, STOP)	PSG-065

OTHERS

Mark	Symbol & Description	Part No.
	V201 Fluorescent indicator tube	PEL1022
	Remote control sensor	GP1U52X

◉Main Board Assembly (PWZ1603)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1	CXA1081S
	IC2	CXA1082BS
	IC3	CXD1130QZ
	IC4	LH5116-15
	IC5	LC7881-C
	IC10	M51955AL
	IC24,IC25	NJM4558D-D
⚠	IC11	NJM78M05FA
⚠	IC12	NJM79M05FA
	IC28	PD0034
	IC6	PD4150A
⚠	IC16 – IC18	TA8410K
	Q6,Q11	DTA124ES
	Q12,Q19	DTC124ES
	Q1	2SA1399
	Q7	2SA933S
	Q5,Q8,Q9,Q16,Q17	2SC1740S
	Q13,Q14	2SD1302
⚠	D25	WL02ML-5004
	D10	1SR139-100
	D17 – D20	1SS254

SWITCH

Mark	Symbol & Description	Part No.
	S1 Tact switch (TEST MODE)	PSG-064

CAPACITORS

Mark	Symbol & Description	Part No.
	C2 – C4	CCCCH300J50
	C95,C96,C165	CCCCH270J50
	C40	CEANP4R7M25
	C16,C22	CEASR47M50
	C5,C10,C43	CEAS101M10
	C100,C101	CEAS222M16
	C48	CEAS3R3M50
	C7,C12,C15,C19,C20,C23,C26, C36,C38,C41,C50,C52 – C54,C56, C57,C59,C63,C66,C69,C70,C97,C98	CEAS330M16
	C92,C161	CCCSL101J50
	C88	CEAS101M35
	C71,C72,C93,C94	CEAS220M25
	C118	CEAS220M35
	C62	CEAS221M10
	C34	CEAS4R7M50
	C102,C103	CEAS471M10
	C61,C86,C91,C132,C133,C141, C143	CKCYF103Z50
	C30,C51,C121,C122	CQMA102K50
	C131	CKCYF473Z50
	C14,C17,C46	CQMA103K50
	C31,C32,C35,C39	CQMA104K50
	C29	CQMA272J50
	C13	CQMA332J50
	C73,C74	CQMA562J50
	C11,C21,C28,C37	CQMA333K50
	C75,C76	CQMA561J50
	C1,C27,C47	CQMA472J50
	C67,C68	CQMA683J50
	C77,C78	CQMA471J50

RESISTORS

Mark	Symbol & Description	Part No.
	R30 Metal thin film	RN1/6PQ3601F
	VR2 Semi-fixed (10k)	VRTB6VS103
	VR3 – VR7 Semi-fixed (22k)	VRTB6VS223
	VR8 Semi-fixed (1k)	VRTS6VS102
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA1 2P Pin jack (OUTPUT)	PKB1009
	X3 Crystal resonator	PSS-012
	X1 Ceramic resonator	VSS1014
	JA3,JA4 Remote control jack	RKN1004

Transformer Board Assembly

CAPACITORS

Mark	Symbol & Description	Part No.
	C301,C303	CKPYF103Z50
	C302,C304 – C307	CKPYX103N25

Switch Board Assembly

SWITCHES

Mark	Symbol & Description	Part No.
	S701 – S704 Slide switch (LOADING POSITION, MAGAZINE)	PSH1004

14. FOR PD-M510/KC, PD-M410/KU AND KC TYPES

NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

CONTRAST OF MISCELLANEOUS PARTS

The PD-M510/KC, PD-M410/KU and KC types are the same as the PD-M510/KU type with the exception of the following sections.

Mark	Symbol & Description	Part No.				Remarks
		PD-M510 /KU type	PD-M510 /KC type	PD-M410 /KU type	PD-M410 /KC type	
	CD packing case	PHG1318	PHG1324	PHG1319	PHG1325	For packing
	Window	PAM1301	PAM1301	PAM1302	PAM1302	
	Front panel	PNW1534	PNW1534	PNW1535	PNW1535	
	Operating instructions (English)	PRB1090	• • • • •	• • • • •	• • • • •	For packing
	Operating instructions (English/French)	• • • • •	PRE1090	• • • • •	• • • • •	For packing
	Operating instructions (English)	• • • • •	• • • • •	PRB1091	• • • • •	For packing
	Operating instructions (English/French)	• • • • •	• • • • •	• • • • •	PRE1091	For packing
◉	Main board assembly	PWZ1603	PWZ1603	PWZ1602	PWZ1602	
◉	Function board assembly	PWZ1612	PWZ1612	PWZ1611	PWZ1611	
	Remote control unit	PWW1034	PWW1034	• • • • •	• • • • •	

MAIN BOARD ASSEMBLY (PWZ1602)

The main board assembly (PWZ1602) is the same as the main board assembly (PWZ1603) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		PWZ1603	PWZ1602	
	D20	1SS254	• • • • •	

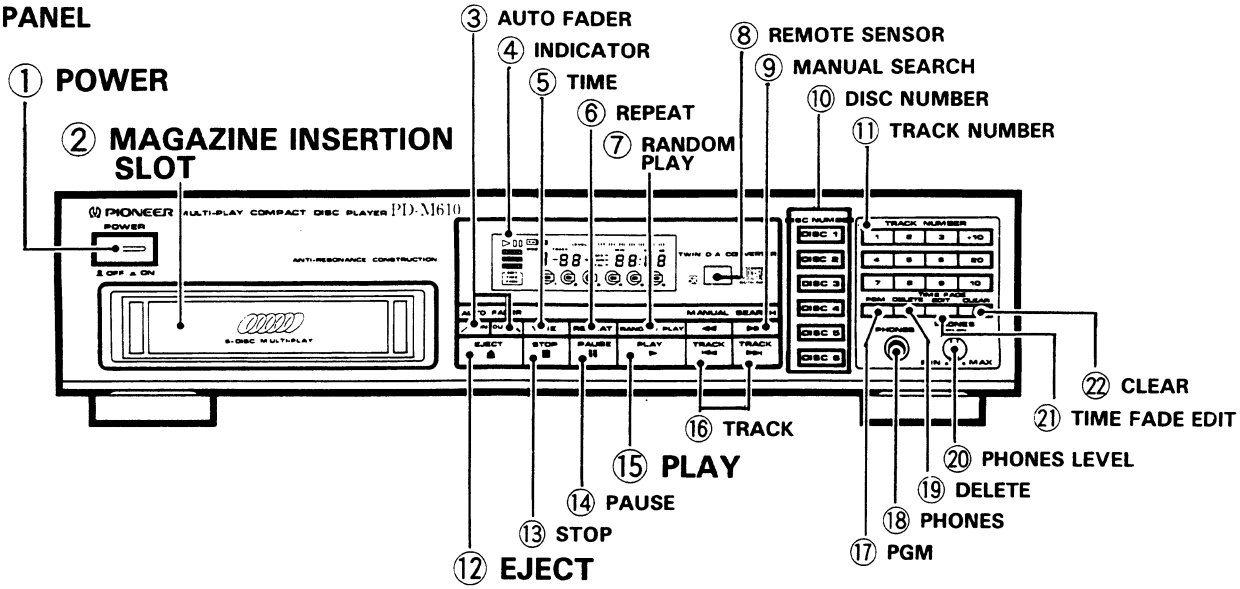
FUNCTION BOARD ASSEMBLY (PWZ1611)

The function board assembly (PWZ1611) is the same as the function board assembly (PWZ1612) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		PWZ1612	PWZ1611	
	Remote control sensor	GP1U52X	• • • • •	

15. PANEL FACILITIES

FRONT PANEL



① POWER switch

Press to turn power to the unit ON and OFF.

② Magazine insertion slot

③ AUTO FADER

⌐IN key:

Press this key to begin playback with fade-in. (Operable only during pause mode).

OUT¬ key

Press to begin fade-out. (When fade-out ends, the player will enter the pause mode.)

④ INDICATORS

DISC : The disc being played or searched is displayed.

TRACK : The number of the track or program currently playing is displayed.

1 ► REP : Lights during repeat playback of one track.

REP : Lights during repeat playback of all tracks.

RANDOM : Lights during random playback.

TIME/REMAIN/TOTAL : Each time the TIME key is pressed, the display changes accordingly.

- TIME : Displays the number and playing time of the track being played.
- REMAIN : The remaining playback time (TRACK REMAIN) of the track being played is displayed (in minutes and seconds). Pressing the key once will display (in minutes and seconds) the remaining playback time (DISC REMAIN) of the disc being played.
- TOTAL : This displays the total number of tracks (TRACK) on the disc and the disc's total playing time in minutes and seconds.

For programmed playback, the remaining time of the track being played and the total program step (TOTAL) of the program are displayed.

MIN : Displays the minutes of the playback time and remaining time of the currently playing track.

SEC : Displays the seconds of the playback time and remaining time of the currently playing track.

PROGRAM : Lights when a program mode.

DELETE : Lights when delete mode.

TIME FADE EDIT : Lights when time fade editing has been set.

LEVEL : The volume level of fade-in, fade- out and digital level control is displayed.

DISC Symbol : The center bar of the disc symbol for the disc being played lights in red. When searching for discs not installed in the magazine, the corresponding disc mark will go off.

⑤ TIME key

- Use to select the method for displaying time on the indicator panel. Each time the key is pressed, the indication changes from TIME, REMAIN (track remain) and REMAIN (disc remain: This will not be displayed during programmed playback.) to TOTAL in that order. (For details concerning the display contents, refer to the explanation about the indicators.)

⑥ REPEAT key

Press this key for repeat playback. Pressing the key once, twice, or three times will change the repeat mode from single track repeat, all tracks repeat, and repeat playback cancellation.

⑦ RANDOM PLAY key

Press this key to start random playback or delete random playback.

⑧ REMOTE SENSOR

⑨ MANUAL SEARCH keys

When the player is in play or pause modes, these keys are pressed to perform fast forward or fast reverse operations, to allow manual searching. These operations are only carried out during the time either key is pressed.

⑩ DISC NUMBER keys (1 – 6)

Use to select disc numbers for playback or programming.

⑪ TRACK NUMBER keys (1 to 10, +10 and ≧ 20)

- These keys are used to specify the track numbers (tracks 1 to 99) for direkt track selection or program entry.
- Durig time fade editing, the keys are used to specify the time period (in minutes).

⑫ EJECT key

Press to eject a magazine or the disc tray. When pressed, any magazine (in case of sigle magazine, the disc tray) inside is ejected forward.

⑬ STOP key

Press to stop playback. When pressed, the player stops all operations.

⑭ PAUSE key

Press to temporarily interrupt playback. When pressed again, the player is released from the pause mode.

⑮ PLAY key

Press to begin playback, and to release the player from the pause mode.

⑯ TRACK SEARCH keys

When the player is in the normal playback, programmed playback or pause modes, these keys are pressed to search for a desired track. Pressing either key causes the player to advance to the next track, or return to the previous track.

⑰ PGM (PROGRAM) key

This is used to program tracks to play a desired sequence.

- Press this key to set the unit to program mode. Then specify the desired disc and tracks with the DISC and TRACK NUMBER keys. The tracks will be programmed as they are entered in this way.

⑱ PHONES (headphones) jack

When you wish to use headphones, insert the plug for the headphones into the headphones jack.

⑲ DELETE key

Press this key to specify the undesired tracks for delete play or delete random play.

⑳ PHONES LEVEL control knob

Use to adjust the level of sound when using headphones. Turning the knob to the right increases the sound level.

㉑ TIME FADE EDIT key

Press to have a fade-out when playback reaches the end of the specified time.

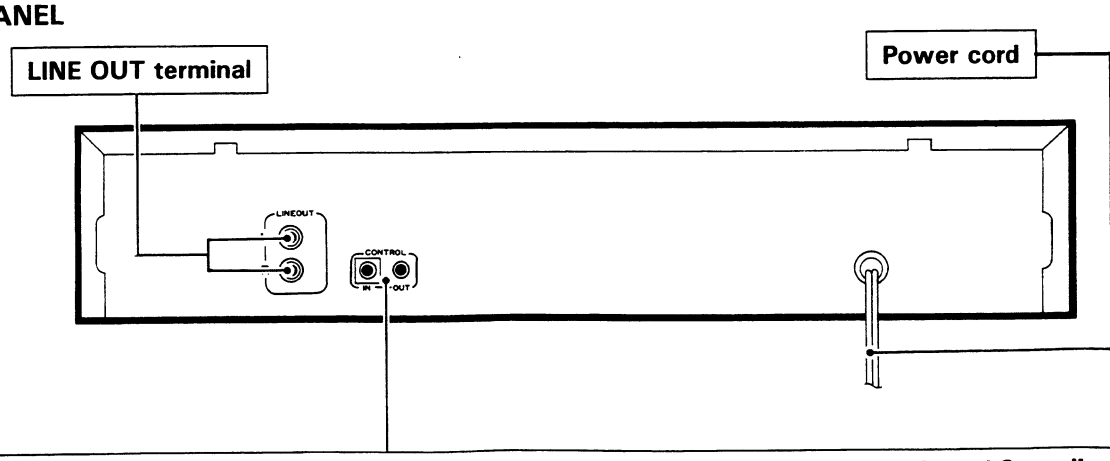
㉒ CLEAR key

Press this key during program entry or playback to clear the last program step. This will also cancel the time fade editing mode and delete mode.

Audio glossary

Fade-in: This is when the sound becomes audible gradually.
Fade-out: This is when the sound gradually becomes inaudible.

REAR PANEL



CONTROL IN terminal (U.S. and Canadian models only)

This terminal is for inputting the remote control signals relayed from an amplifier with a sensor for receiving control signals from a remote control unit and carrying the Pionner ⓡ mark. For instructions regarding connection and operation, please refer to the operating instruction manual for your stereo amplifier.

CONTROL OUT terminal (U.S. and Canadian models only)

This terminal is for further relaying remote control signals to other components carrying the Pioneer ⓡ mark. Please connect to the control input terminal of the other component.

16. SPECIFICATIONS

• PD-M610

1. General

Type . . . . . Compact disc digital audio system
Power requirements
European models . . . . . AC 220 V, 50/60 Hz
U.K., Australian models . . . . . AC 240 V, 50/60 Hz
U.S., Canadian models . . . . . AC 120 V, 60 Hz
Other models . . . . . AC 110/120 - 127/240 V (switchable) 50/60 Hz
Power consumption
European, U.K., Australian, U.S., Canadian models . . . . . 13 W
Other models . . . . . 13 W
Operating temperature . . . . . +5°C – +35°C
Weight . . . . . 5.1 kg (11 lb, 4 oz)
External dimensions . . . . . 420(W) × 327 (D) × 100 (H) mm 16-9/16(W) x 12-7/8 (D) x 3-15/16 (H) in

2. Audio section

Frequency response . . . . . 4 Hz – 20 kHz (± 0,5 dB) (EIAJ)
S/N ratio . . . . . more than 104 dB (EIAJ)
Dynamic range . . . . . more than 95 dB (EIAJ)
Channel seperation . . . . . more than 98 dB (EIAJ)
Harmonic distortion . . . . . less than 0.005% (EIAJ)
Output voltage . . . . . 2.0 V
Wow and flutter . . . . . less than ±0.001% (W.PEAK) (below measurable level) (EIAJ)
Channels . . . . . 2-channel (stereo)

3. Output terminal

Audio line output
Headphone jack (with volume control)
Control input/ouput terminals (U.S. and Canadian models only)

4. Functions

Number of discs to be strored - maximum 6.

Basic operation keys
- PLAY, PAUSE, STOP

Search function
- Disc selection
- Track selection
- Manual search
- Track search

Programming
- Maximum 32 steps
- Pause
- Direct programming
- Program check/Correction (remote control unit only)
- Program clear (single track or all tracks)

Repeat functions
- 1 track repeat
- All discs repeat
- Program repeat
- Random play repeat
- Delete play repeat
- Delete random play repeat

Random play
- Random play (repeat also available)
- Delete random play (repeat also available)

Switching display
- Time consumed, remaining time, and total time

Timer start

Digital Level Controller
Volume control can be done with the remote control unit.

One-touch fade
Fade-in and fade-out possible.

Time fade editing
Fade-out with part specification is possible.

Except U.K. and European models
Remote control unit for program transmission
- Enables program transmission from remote control unit to player.
- LCD display
- Transmission indicator

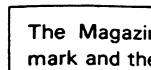
5. Display

FL tube display
- Passing time display (min, sec)
- Remaining time display
- Total time display
- Disc number, track number
- Program step number
- Program indicator
- Repeat indicator
- Random play indicator
- ATT level display
- Time fade editing indicator
- Delete indicator
- Play indicator
- Pause indicator
- Disc mark

6. Accessoires

- Remote control unit 1
- Size AAA/R03/dry batteries 2
- Six-compact-disc magazine 1
- Single-compact-disc magazine . . . . . 1 (Except U.K. and European models)
- Output cable 1
- Control cord . . . . . 1 (U.S. and Canadian models only)
- Operating instructions 1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

The Magazine Type Multi-Play CD PLayers with  mark and the Magazines with the same mark are compatible for 5-inch (12cm) discs.

● PD−M510

1. General

Type ..... Compact disc digital audio system
Power requirements
European models ..... AC 220V, 50/60Hz
U.K., Australian models ..... AC 240V, 50/60Hz
U.S., Canadian models ..... AC 120V, 60Hz
Other models ..... AC 110/120−127/220/240V (switchable) 50/60Hz
Power consumption 11W
Operating temperature ..... +5°C−+35°C (+41°F−+95°F)
Weight 4.9kg (10lb 13oz)
External dimensions ..... 420(W) × 325(D) × 90(H) mm
16-9/16(W) × 12-13/16(D) × 3-9/16(H) in

2. Audio section

Frequency response ..... 4Hz−20kHz ($\pm^{0.5}_{1}$dB) (EIAJ)
SN ratio ..... more than 102dB (EIAJ)
Dynamic range ..... more than 90dB (EIAJ)
Channel separation ..... more than 94dB (EIAJ)
Output voltage 1.8V
Wow and flutter ..... less than (±0.001% W.PEAK) (below measurable level) (EIAJ)
Channels ..... 2-channel (stereo)

3. Output Terminal

Audio line output
Control input/output terminals (U.S. and Canadian models only.)

4. Functions

Number of discs to be stored − maximum 6.
Basic operation keys
- PLAY, PAUSE, STOP

Search function
- Disc selection (6 keys)
- Manual search
- Track search

Programming
- Maximum 32 steps
- Pause
- Direct programming
- Program clear

Timer start
- Timer start play

Repeat functions
- All-discs repeat
- Program repeat
- Random play repeat

Random Play
- Random play

Switching display
- Time consumed, remaining time, and total time

5. Display

FL tube display
- Passing time display (min, sec)
- Remaining time display
- Total time display
- Disc number, track number
- Program step number
- Program indicator
- Repeat indicator
- Random play indicator
- Play indicator
- Pause indicator
- Disc mark

6. Accessories

- Remote control unit 1
- Size AAA/R03 dry cell batteries 2
- Six-compact-disc magazine 1
- Control cord (U.S. and Canadian models only.) 1
- Output cable 1
- Operating instructions 1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

The Magazine Type Multi-Play CD Players with mark and the Magazines with the same mark are compatible for 5-inch (12cm) discs.

● PD−M410

1. General

Type ..... Compact disc digital audio system
Power requirements
European models ..... AC 220V, 50/60Hz
U.K., Australian models ..... AC 240V, 50/60Hz
U.S., Canadian models ..... AC 120V, 60Hz
Other models ..... AC 110/120−127/220/240V (switchable) 50/60Hz
Power consumption 11W
Operating temperature ..... +5°C−+35°C (+41°F−+95°F)
Weight 4.9kg (10lb 13oz)
External dimensions ..... 420(W) × 325(D) × 90(H) mm 16-9/16(W) × 12-13/16(D) × 3-9/16(H) in

2. Audio section

Frequency response ..... 4Hz−20kHz ($\pm^{0.5}_{1}$dB) (EIAJ)
SN ratio ..... more than 102dB (EIAJ)
Dynamic range ..... more than 90dB (EIAJ)
Channel separation ..... more than 94dB (EIAJ)
Output voltage 1.8V
Wow and flutter ..... less than (±0.001% W.PEAK) (below measurable level) (EIAJ)
Channels ..... 2-channel (stereo)

3. Output Terminal

Audio line output
Control input/output terminals

4. Functions

Number of discs to be stored − maximum 6.
Basic operation keys
- PLAY, PAUSE, STOP

Search function
- Disc selection (6 keys)
- Manual search
- Track search

Programming
- Maximum 32 steps
- Pause
- Direct programming
- Program clear

Timer start
- Timer start play

Repeat functions
- All-discs repeat
- Program repeat
- Random play repeat

Random Play
- Random play

Switching display
- Time consumed, remaining time, and total time

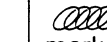
5. Display

FL tube display
- Passing time display (min, sec)
- Remaining time display
- Total time display
- Disc number, track number
- Program step number
- Program indicator
- Repeat indicator
- Random play indicator
- Play indicator
- Pause indicator
- Disc mark

6. Accessories

- Six-compact-disc magazine 1
- Control cord 1
- Output cable 1
- Operating instructions 1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

The Magazine Type Multi-Play CD Players with  mark and the Magazines with the same mark are compatible for 5-inch (12cm) discs.